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BEHAVIOR PATTERNS OF NORMAL CHILDREN.

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DURING THE PERIOD 1930 TO 1938, THE PATTERNS OF BEHAVIOR OF A BASIC SAMPLE OF 138 THREE TO FOUR AND ONE-HALF YEAR-OLD CHILDREN WERE OBTAINED BY TEACHER RATINGS. THE TEACHERS USED A RATING CHART OF 61 BEHAVIOR VARIABLES. TEN BEHAVIOR PATTERNS WERE ISOLATED FROM THIS GROUP. EACH PATTERN, FOR EXAMPLE, EMOTIONAL REACTIVITY, WAS COMPRISED OF SEVERAL BEHAVIOR MANIFESTATIONS, FOR EXAMPLE, (1) DISPLAYS TEMPER, (2) CRIES, AND (3) AROUSED BY THWARTING FROM ADULTS. THE SEVERAL BEHAVIOR MANIFESTATIONS HAD THE COMMON FACTOR DESIGNATED BY THE NAME OF THE PATTERN. MOST OF THE TEN PATTERNS WERE FOUND TO BE CONSISTENT IN FORM FOR DIFFERENT SAMPLES OF CHILDREN. THERE WERE NO QUALITATIVE DIFFERENCES IN BEHAVIOR PATTERNS ON THE BASIS OF SEX. COMPARISONS OF A SUBGROUP OF THE BASIS SAMPLE AT TWO TIME PERIODS, ONE 18 MONTHS AFTER THE OTHER, SHOWED SOME QUALITATIVE AND QUANTITATIVE CHANGES IN BEHAVIOR PATTERNS WITH GROWTH OF THE CHILD. SIMILARLY, COMPARISONS OF BEHAVIOR PATTERNS OF THE SAME SAMPLE OF CHILDREN IN FIRST, THIRD, AND FIFTH GRADES INDICATED SOME SHIFTING IN BOTH THE TYPE AND IMPORTANCE OF BEHAVIOR PATTERN DIMENSIONS. THIS STUDY INVESTIGATED BEHAVIOR CHARACTERISTICS OF CHILDREN BY CROSS-SECTIONAL AND LONGITUDINAL APPROACHES. IN GENERAL, THE STUDY FOUND A RELATIVE CONSISTENCY IN THE BEHAVIOR PATTERN FORMS THEMSELVES AND IN THE PATTERNS OF A PARTICULAR CHILD OVER THE TIME PERIOD INVOLVED. (WD)

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Revised

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A Report From The
CHILD STUDY CENTER
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Behavior Patterns of Normal Children

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In this report by a research team headed by Professor Samuel R. Pinneau, use has been made of behavior records, systematically assembled in the files of the Institute of Human Development over a period of fourteen years.

The original data, concerned with the behavior of children in nursery school and elementary school settings, are based on a rating schedule, the California Behavior Inventory, prepared by Dr. Herbert S. Conrad. The observations of children in the Institute Nursery School were recorded at six month intervals by two head teachers (Miss Lucille Allen and Mrs. Gladys Ludwig) and by assistants.

The present study utilizes methods similar to those frequently employed in the past by the Institute of Human Development; normal samples of children observed in relatively free social situations, analysis of individual differences on a cross-sectional basis, and a longitudinal follow up of individual subjects. The results are significant with reference to problems concerning the organization and consistency of behavior. In addition to their theoretical importance it is reasonable to believe that the findings will be of interest and value to teachers and to parents.

Harold E. Jones
Berkeley, California
May 20, 1960

Acknowledgements

We are deeply indebted to the late Dr. Harold E. Jones, former director of the Institute of Child Welfare (now the Institute of Human Development) at the University of California, Berkeley, for making the data available for this study. Such studies as these constitute blocks of the monumental research program he directed. It is appropriate that it is to Professor Harold E. Jones that the published works from the study will be dedicated.

We also wish to express our appreciation to Dr. Mary Cover Jones, wife of Dr. Harold E. Jones, for her criticisms and encouragement during the course of this study.

Processing of the data of this study was initiated at the Computer Center, University of California, Berkeley, while the first author was a Research Fellow of the Elizabeth McCormick Memorial Fund. The final analyses presented were done by the first author at the Western Data Processing Center, University of California, Los Angeles, subsequent to the official termination of the grant. We wish to thank these centers whose cooperation and facilities made possible the analyses of these data.

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Chapter I

Introduction

For a number of years there has been a growing body of literature on the physical development and test performances of children of all ages. This literature has not been paralleled by broad studies of specific behaviors that characterize children, and most notably lacking are studies of large numbers of behaviors of large groups of children. Theory, data collection, and analysis in such comprehensive studies comprise an imposing task. It is, however, an important one, and the present report is an attempt in that direction. This report describes a number of analyses of the organization of children's behavior during early and middle childhood, making both cross-sectional and longitudinal comparisons. Achievement in certain elementary grades is also studied and compared with concurrent and previous behavior.

Descriptive studies of the organization of behavior of children at different ages may make several contributions to knowledge:

> Such studies, noting appropriate limitations in sampling, serve as accounts of behavioral themes that occur at different ages. Knowledge of the persistence of these themes, however, requires longitudinal

methodology. An adequate developmental account of psychological functioning and behavior requires longitudinal information.

Descriptive accounts of the organization of behavior serve to stimulate theory and research tracing historical sequences or relationships in the development of the individual. If broad spectra of behavior can be found to coalesce into a number of clusters, then the door is opened for reaserch that attempts to account for these patterns.

Methodological contribution may also result from studies that sketch patterns of behavior. If behaviors are found to cluster, then measuring certain elements of the cluster may permit prediction to the cluster or pattern as a whole in subsequent studies. The elements may thus serve as valid indices, avoiding the task of complete measurement of all items in the cluster. One study will not, or course, provide firm footing for such practice, but a cummulation of evidence may.

The present report is an empirical study based on data collected at the Institute of Human Development, University of California, Berkeley. The nursery school data were gathered in an attempt to describe as completely as reasonably possible, the behavior of children in nursery school. With this in view, 61 behavioral traits were selected by the

Institute staff from an inventory of nursery school behavior (Conrad, 1933), highlighting what might be referred to as a focus upon specific molar actions in which nursery school children engage. To be sure, an implicit,if not explicit, theoretical viewpoint dictated the selection of these behaviors. It cannot be said to be, for good or ill, representative of a particular identifiable theory, such as psychoanalytic, Gestalt, or learning theory. Doubtless, a concern with unforeseeable future utility which forces itself upon all longitudinal studies, was a major factor in the selection both of the empiricist point of view and the specific content selected for study. The timeless nature which appears to characterize the behaviors chosen by the staff indicates the appropriateness of the selection.

Our purpose in this study, then, is not to test theory, but rather to examine the covariation of fairly specific and bounded, yet molar, behaviors. More specifically, the aims of the study are as follows:

1. To determine the patterns of behavior for a group of normal children in nursery school as these behaviors are described in specific molar terms.

2. To assess the extent to which two different samples of children from the same population display similar patterns of behavior.

3. To determine the patterns of behavior for boys and girls separately, and to ascertain their similarity.

4. To determine the patterns of behavior for a group of children at age three years and again for the same group at age four and one-half, to compare the patterns at the two age levels and to measure their consistency for this age span.

5. To determine patterns of behavior at elementary grades one, three, and five, for sub-samples of the original subjects, to measure behavioral consistency during these years, and to assess the similarity of the patterns at the different age levels.

6. To compare results from separate analyses of elementary school behavior with the behavior patterns at nursery school age. Additionally, to relate these patterns to achievement data for grades one, three, and five.

Methods

Subjects

The 138 children on whom this report is based attended the nursery school at the Institute of Human Development, University of California, Berkeley, between the years 1930 and 1938. They were members of groups of about 30 children, comprising either a morning or afternoon session. The admission policies of the Institute Nursery School require that the families who use it are fairly stable residents of the community, in that it is necessary for a child to be registered soon after birth to be sufficiently advanced on the waiting list to be chosen to participate at age two and one-half or three years. It would be unlikely then, that the families represent a random sample from the Berkeley population, or from the population at large. They in fact do not.

Mid-parent education of the children in the study was equivalent to graduation from college, indication that these children came from highly educated families. IQ of the sample was also much higher than would be expected in a random sample from the general population. Those Ss who remained in the sample through the third grade were found, at that time, to average 26 points above the mean IQ for the general population. This high level of intelligence test performance does not differ markedly from the Berkeley average at the same age: Bayley (Jones and Bayley, 1941) selected children born between specified dates in hospitals in this city as subjects for the Berkeley Growth Study. At a comparable test-age to the children in the present sample,

TABLE 1

FACTOR ANALYTIC STUDIES : MAJOR ANALYSES

I CROSS-SECTIONAL INVESTIGATIONS
(NURSERY SCHOOL)

	BEHAVIOR RATINGS	
1 TOTAL SAMPLE	Boys 73 Girls 65 Total 138	
2 INVARIANCE	1930-1933 Boys 35 Girls 34 Total 69	1934-1938 Boys 38 Girls 31 Total 69
3 SEX	Boys (N = 73) Girls (N = 65)	

TABLE 2

FACTOR ANALYTIC STUDIES : MAJOR ANALYSES

II LONGITUDINAL INVESTIGATIONS

1 CONSISTENCY

(NURSERY SCHOOL)

Boys	37
Girls	32
Total	69

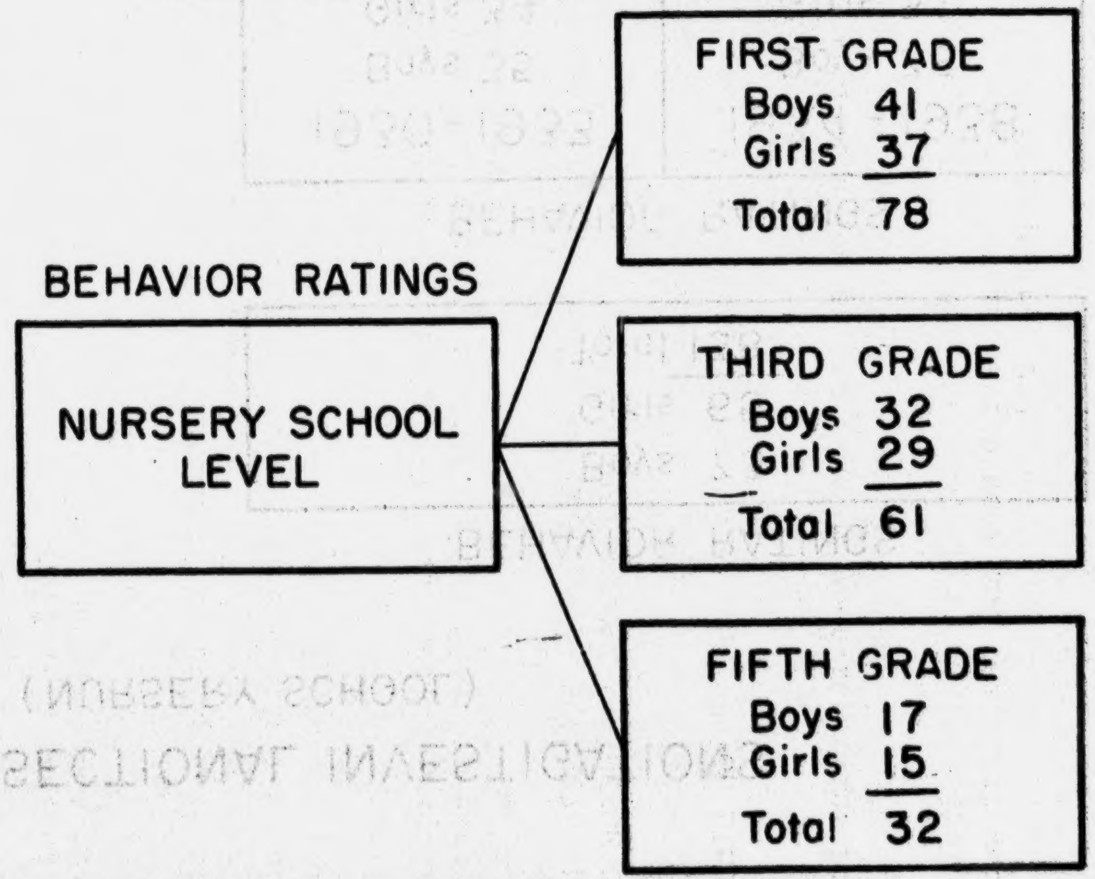
BEHAVIOR RATINGS

Age : 3 Years	Age : 4½ Years

BEHAVIOR AND ACHIEVEMENT RATINGS

2 CONSISTENCY

(NURSERY SCHOOL TO ELEMENTARY SCHOOL)



BEHAVIOR RATINGS

NURSERY SCHOOL LEVEL

FIRST GRADE	
Boys	41
Girls	37
Total	78

THIRD GRADE	
Boys	32
Girls	29
Total	61

FIFTH GRADE	
Boys	17
Girls	15
Total	32

her subjects obtained a mean IQ of 123 on Form L of the Stanford-Binet. The Guidance Study, a larger sample and one representative of children born in Berkeley in the early 30's, obtained a mean IQ of 119 at this test-age. Thus, while these results suggest that our sample of children is above what might be estimated as the Berkeley average, it is not a highly select group, relative to the community from which the children came.

The sub-groups forming the basis of the analyses for the cross-sectional studies are shown in Table 1. An analysis of data from the entire group of 138 children (Basic Sample) at ages three to four years is the analysis relevant to our first objective. The average age at which the ratings were made was three and one-half years. These same data were also used in the other cross-sectional analyses, to determine the comparability of factor patterns for two samples, and to compare boys and girls.

The discussion of the consistency of behavior in the nursery school is based on different data gathered on a sub-sample of the total group; see Table 2. The first group of ratings which we used on these 69 Ss was obtained at an average age of three years; range, two and one-half to three and one-half years. The second group of ratings were made on these same children one to two years later at an average

Table 3

Behavior Scales

General Emotional Traits

1. Overt emotion is easily aroused
2. Overt emotion is turbulent, violent
3. Emotion is persistent
4. Cries
5. Lacks inhibition

Mood Characteristics

6. Agreeable, good-natured
7. Smiles, laughs
8. Pleasant facial expression
9. Enthusiastic
10. Reckless, carefree
11. Free from apprehension
12. Not sensitive
13. Does not pout
14. Does not whine

Anger

15. Aroused when thwarted by inanimate objects
16. Aroused by thwarting from children
17. Aroused by thwarting from adults
18. Displays temper
19. Aggressively combative

Self-assertion

20. Acquisitive
21. Competitive
22. Maintains own rights
23. Initiates play
24. Teases
25. Bosses
26. Bullies
27. Negativistic
28. Vain
29. Bids for attention

Character Traits

30. Kind
31. Unselfish
32. Dependable
33. Responsible
34. Respectful of others' rights
35. Self-reliant

Social Traits

36. Friendly
37. Social, not solitary
38. Friendships close, intimate
39. Responds to affection
40. Popular
41. Rarely embarrassed
42. Responds to social pressure
43. Cooperates with group
44. Leads others
45. Talkative
46. Persuasive
47. Expressive voice

Habits of Work and Play

48. Active
49. Vigorous
50. Numerous interests
51. Ambitious
52. High standards in work and play
53. Deliberates
54. Concentrates
55. Perseveres
56. Curious
57. Imaginative
58. Original
59. Rarely a spectator
60. Adjusts to new situations
61. Free from nervous habits

Table 4

Illustrations of the Scales Used in Rating the Behaviors

Popular

1	2	3	4	5	6	7
Child is unpopular; other children seldom choose him as a playmate, and so do not care to have him as a member in group-play.			Average popularity; better liked by some children than by others.		Child is a favorite with the other children; other children like especially to have the child as a playmate or as a member in group-play.	

Overt emotion is easily aroused

1	2	3	4	5	6	7
Child is very difficult to move to overt emotional response. Dully unresponsive or indifferent. Exceptionally strong stimuli, and exceptionally pleasant, (or unpleasant) situations are required to produce overt emotion in the child.			Child is moved to overt expression of emotions with average difficulty or ease.		Child is very easily moved to overt emotional response. Highly responsive. Mild unexpected stimuli, casual reproach, little accidents, and in general relatively weakly stimulating situations readily produce definite overt emotion in the child.	

Dependable

1	2	3	4	5	6	7
Child is untrustworthy and unreliable when not being watched. Sly. Behavior when not under observation is different from that when being watched.			Usually trustworthy, but more likely to misbehave or take an unfair advantage in prolonged absence of observation than when under observation.		Child is exceptionally trustworthy and dependable, even when not being watched by other children or adults. Not at all sly, does not require watching.	

age of four and one-half years.

In the studies of behavior and achievement in selected grades in elementary school, as shown in Table 2, all of the original Ss were used who had been observed in nursery school between the ages of 26 months and 52 months, and on whom data were available in either the first, third, or fifth grades.

The Data: Nursery School Studies

The basic information on the subjects of this study consists of behavior ratings of individual children during each semester of attendance in nursery and elementary schools. The ratings were based on 61 of the more reliable and comprehensive scales of behavior of Conrad's California Behavior Inventory (CBI) of Nursery School Children (1933). The list of 61 scales is presented in Table 3. Each behavior scale was defined on a seven-point continuum in terms of specific behaviors characteristic of the end points and the midpoint of the scale. Examples of the definitions of these behaviors may be seen in Table 4. Because of the great length of Conrad's Inventory, the staff at the Institute selected, on the basis of earlier research with this instrument, these 61 scales to use in their observations of the nursery school children.

The two or three teachers at the Institute nursery school independently rated each child every semester of attendance on each of the behavior scales. Several controls were exercised in an attempt to minimize rating problems: (1) Care was taken to ensure that the raters (nursery school teachers at the Institute) were thoroughly versed in the scales to be used and acquainted with the children to be rated. This was accomplished in part through discussion in detail of the individual scales. The teachers were also provided information on expected distributions of the behaviors in a group of average children, this to serve in a general way as a frame of reference for the use of the scale. The teachers rated the children only after considerable opportunity to observe them in a variety of nursery school situations. (2) Each teacher rated all children of a given class on only one dimension of behavior each day, thus minimizing halo effects that might occur if a given child were rated on all behaviors before the other children were rated. (3) The rating sheets were arranged in such a way as to anchor the ratings in behavior by presenting the scale, together with the behavioral examples, at the top of the sheets. (4) The names of the children to be rated were listed according to age and the teachers were instructed to keep the age of the child in mind in an attempt to minimize age bias. (5) The order in which the behaviors were rated varied from teacher to teacher so that a given child was rated at different times on a given scale during

Table 5

Elementary School Scales

Behavior Ratings

1. Emotions readily expressed
2. Agreeable, good-natured
3. Enthusiastic
4. Competitive
5. Initiates work or play
6. Teases
7. Negativistic
8. Bids for attention
9. Self-reliant
10. Sympathetic, kind
11. Respectful of others' rights
12. Friendly
13. Social, not solitary
14. Self-composed, poised
15. Leads others
16. Busy
17. Concentrates
18. Shows originality
19. Rarely a spectator
20. Rarely restless or fidgity

Ratings of Achievement

1. General Motor Coordination
2. Manual Dexterity
3. Language Facility
4. Reading
5. Arithmetic
6. Spelling
7. Drawing
8. Penmanship
9. Social Studies

the semester of school attendance. In addition, the teacher did not rate the behaviors in the same sequence.

The Data: Elementary School Studies

Twenty behavioral variables were rated at the elementary school level, these 20 being selected from the 61 that were used at the nursery school level (see Table 5). This fewer number of behaviors was deemed necessary because of the time required for the longer list and because ratings of achievement were also desired at these elementary grade levels.

Elementary school teachers made the ratings of both behavior and achievement on those of their present pupils that were part of the original sample. These teachers were contacted by Institute personnel who explained the purposes of the ratings, provided the rating forms, and discussed the scales with the teachers. The rating procedure for this group differed in that a given child was rated on all behavior scales before other children were rated (if other children from the sample were in the same elementary school class). This was an unavoidable change in the procedure since the children were now in a variety of grades and in a number of different elementary schools.

The achievement variables selected also appear in Table 5. These were intended to provide broad coverage of elementary school subjects which the child was encountering during the school year.

Ratings on the behavior and achievement variables were obtained on a five point scale with the end points defined in an abbreviated form of the nursery school scales. These ratings were obtained once a semester if at all possible. Table 2 indicates the number of cases earlier rated on whom data are available for the various grades.

Analyses

At the nursery school level, the score on each behavior is the sum of the ratings independently assigned the subject by the teachers. Where three observers rated each child during a semester, as in the first four years of study, the raters were given equal weight; where only two ratings were available, the sum was adjusted. In the elementary school, ratings from two semesters were summed to provide indices of behavior and achievement for the indicated grade.

Principal components factor analyses were performed on the samples of data in such a way as to conform to the objectives set forth above. The resultant factors whose eigenvalues were equal to or greater than 1.00 were then rotated using the varimax criteria developed by Kaiser (1958). The patterns of behavior presented are those factors thus rotated. Where factor scores are utilized, they were computed according to the formula presented by Harman (1960). Coefficients of factor invariance and subject invariance were calculated by procedures developed by Pinneau and Newhouse (1964).

Part I: Cross-sectional Studies

Chapter II

Behavioral Patterns for the Basic Group

One of the prime issues with which we are concerned is the nature of the patterns or factors obtained by an analysis of the recorded behavior of the Basic Sample, (total group of 138 children). This analysis of the Basic Sample provides a logical baseline with which the results found for the other groups are compared.

The data used in this analysis were gathered on these children when they were an average of three and one-half years of age, with a range from 36 to 53 months. This is a span of 17 months, yielding quite a difference in age between the oldest and youngest in the group. It will be remembered that these children were rated in relation to children of their own age; this was essential because of the rapid change in behavior at these young ages.

The findings indicated that the general aspects of the behavior of these children could be accounted for by ten factors. Each of these factors is given a label which the writers feel best describes each of the patterns. The reader may find that the adequacy of these labels will vary somewhat from factor to factor. These names are recognized as tentative. It is at best a tenuous and risky business

Table 6

Variable		Basic Sample Factor I
1.	Overt emotion is easily aroused	.820
16.	Aroused by thwarting from children	.811
15.	Aroused when thwarted by inanimate objects	.772
18.	Displays temper	.764
5.	Lacks inhibition	.761
2.	Overt emotion is turbulent, violent	.738
17.	Aroused by thwarting from adults	.719
20.	Acquisitive	.697
31.	Unselfish	-.678
22.	Maintains own rights	.659
4.	Cries	.635

Sum of squared loadings for all variables, 10.631

Minimum value which variable must load on the factor, .600.

to attempt to identify the characteristic among the variables forming a pattern that is common to such variables. Other names may be conceptually superior to the ones that are attached. In the final analysis, the meaning of a pattern rests with the traits and loadings which define it.

Each of the important patterns isolated in the analysis will be presented in terms of those variables exceeding a specified minimum loading value, taking the factors in order of the extent to which they account for the total variance. The criterion of importance is then the sum of the squared factor loadings on any factor. The sum of squared loadings and other figures used in the text also appear in the tables; however, they are usually rounded to one less decimal point in the text. When the exact scale names are used in the text, they are underlined.

Emotional Reactivity

One of the two most important factor patterns for the Basic Sample is presented in Table 6. The sum of the 61 squared loadings for this factor is 10.63. The variables constituting the large factor loadings in Table 6 have many of the characteristics usually ascribed to volatile temperament or to immediate eruption of emotional responses triggered by objects or people in the environment of nursery school children. Since all of the variables with high loadings

Table 7

Variable	Basic Sample Factor II
40. Popular	.882
38. Friendships close, intimate	.862
37. Social, not solitary	.835
43. Cooperates with group	.825
44. Leads others	.771
50. Numerous interests	.761
59. Rarely a spectator	.742
48. Active	.680
9. Enthusiastic	.673
46. Persuasive	.670
23. Initiates play	.635
51. Ambitious	.604

Sum of squared loadings for all variables, 10.585

Minimum value which variable must load on the factor, .600.

on this factor have to do with emotional expression or the lack of it, this factor has been identified as emotional reactivity.

Sociability

The behaviors that constitute another of the most important factor patterns in the analysis of the Basic Sample are shown in Table 7. Large to moderate loadings are shown by the variables popular, friendships close, social, cooperates with group, etc., identifying what we have called a dimension of sociability. This factor might as well have been labeled an extraversion-introversion dimension; the crucial characteristic seems to be relating to others in a friendly, cooperative, and frequent manner. This factor accounts for nearly as much common variance as the emotional reactivity factor; the sum of squared factor loadings equals 10.58.

Socialization

Table 8 presents the variables and factor loadings that comprise the third largest factor for the Basic Sample. The sum of 61 squared factor loadings is 5.77. This factor appears to indicate a dimension of socialization or superego development. A nursery school child scoring high on the variables demarcating this factor would appear to be a reliable child, of the "teacher's helper" variety. He gets

Table 8

Variable	Basic Sample Factor III
32. Dependable	.813
30. Kind	.757
34. Respectful of others' rights	.705
24. Teases	-.677
26. Bullies	-.660
33. Responsible	.654
42. Responds to social pressure	.566
12. Not sensitive	-.472
27. Negativistic	-.451
19. Aggressively combative	-.447

Sum of squared loadings for all variables, 5.767

Minimum value which variable must load on factor, .400.

Table 9

Variable	Basic Sample Factor IV
48. Talkative	.796
56. Curious	.747
29. Bids for attention	.566
58. Original	.543
36. Friendly	.503
57. Imaginative	.492
41. Rarely embarrassed	.468
47. Expressive voice	.433
25. Bosses	.421

Sum of squared loadings for all variables, 4.469

Minimum value which variable must load on the factor, .400.

along well with other children and adults and may sometimes deny himself pleasurable activities and negative impulses. At the other extreme is the child who may be affectionately called "the little monster". He may run roughshod over his age mates and try it with adults. The child with low scores on this factor might be characterized as having an under-developed super-ego or conscience.

Verbal Creativity

The fourth factor pattern in order of importance, with a sum of 61 squared factor loadings equal to 4.47, is shown in Table 9. Upon careful inspection of this factor pattern it appears that the common element in it is verbal creativity. Children with high scores on this pattern bid for attention and are talkative, curious, original, imaginative, etc. Children with low scores on the pattern are rather silent, lack curiosity, are withdrawn, unoriginal, unimaginative, etc. Apparently these children are reticent, rarely play "make believe", and are stereotyped in their work and play.

Confidence

The factor pattern fifth in importance in the analysis of the data for the Basic Sample is a constellation of variables reflecting the amount of confidence shown by the children while in the nursery school setting. These variables, as can be seen in Table 10, are free from apprehension, not sensitive, adjusts to new situations, rarely embarrassed,

Table 10

Variable		Basic Sample Factor V
11.	Free from apprehension	.828
12.	Not sensitive	.688
60.	Adjusts to new situations	.654
41.	Rarely embarrassed	.643
3.	Emotion is persistent	-.448
35.	Self-reliant	.409
10.	Reckless, carefree	.408

Sum of squared loadings for all variables, 3.778

Minimum value which variable must load on the factor, .400.

Table 11

Variable		Basic Sample Factor VI
54.	Concentrates	.775
52.	High standards in work and play	.740
61.	Free from nervous habits	.557
51.	Imaginative	.465
58.	Original	.466

Sum of square loadings for all variables, 3.319

Minimum value which variable must load on the factor, .400.

etc. The child with high scores on these variables presents a carefree and unapprehensive picture. He seldom worries or becomes frightened in anticipation of an unpleasant or dangerous situation. He adjusts to new situations with little anxiety, is very self-composed, and rarely shows signs of embarrassment. The child with low scores on the variables constituting the confidence factor would, in short, reflect tension, worry or anxiety in much of his behavior. (Sum of squared loadings for this factor equals 3.78)

Achievement

The sixth constellation of variables appears to relate to achievement, or how well a child applies himself to his own goals or the goals of the nursery school program. As can be seen in Table 11, it includes concentrates, high standards in work and play, free from nervous habits, imaginative, original, etc. This factor accounts for a relatively small proportion of the total variance - - sum of squared loadings equals 3.32. The achievement factor pattern seems to correspond quite well with the description of high and low achievers at later age levels. However, in a nursery school setting, emphasizing free-choice rather than competition and attainment of academic skills and goals, there is question whether the occurrence of such behavior

Table 12

Variable	Basic Sample Factor VII
8. Pleasant facial expression	.753
13. Does not pout	.638
6. Agreeable, good-natured	.632
7. Smiles, laughs	.558
14. Does not whine	.416

Sum of squared loadings for all variables, 3.230

Minimum value which variable must load on the factor, .400.

Table 13

Variable	Basic Sample Factor VIII
55. Perseveres	.586
21. Competitive	.539
35. Self reliant	.519
14. Does not whine	.421
51. Ambitious	.419
19. Aggressively combative	.414

Sum of squared loadings for all variables, 2.844

Minimum value which variable must load on the factor, .400.

patterning is predictive of achievement in the elementary grades where academic achievement in a more restricted curriculum is emphasized. This issue is investigated later; the results are presented in Chapter VII.

Affability

The seventh factor could be identified, although as seen in Table 12, there were not as many moderate loadings as were found on any of the previous factors; sum of squared loadings equals 3.23. However, with high to moderate loadings on pleasant facial expression, does not pout, agreeable, smiles, and does not whine, this personality dimension is tentatively identified as affability. The two extremes of this factor suggest quite different modes of adjustive responses. The child high on affability seems to take a posture of easy-going congeniality. In contrast, the child at the other end of the continuum appears grumpy, pouting and disagreeable.

Self-assertion

With moderate loadings on the variables perseveres, competitive, self-reliant, does not whine, ambitious, and aggressively combative, the factor pattern displayed in Table 13 seems to depict the extent of self-assertiveness displayed in the child's daily behavior. One pole of this factor describes an independent, self-sustaining child;

Table 14

Variable	Basic Sample Factor IX
39. Responds to affection	.794
27. Negativistic	.362
17. Aroused by thwarting from adults	.348
29. Bids for attention	.342
3. Emotion is persistent	.333

Sum of squared loadings for all variables, 1.964

Minimum value which variable must load on the factor, .300.

Table 15

Variable	Basic Sample Factor X
28. Vain	.840
25. Bosses	.296
33. Responsible	.259
55. Perseveres	-.217
42. Responds to social pressure	.205
48. Active	-.205

Sum of squared loadings for all variables, 1.636

Minimum value which variable must load on the factor, .200.

the other pole describes behaviors of dependency and of little interjection in relation to others. The sum of the squared loadings for the 61 variables on this factor is only 2.84, making the factor eighth largest for the Basic Sample.

Affection

While by far the most important variable shown in Table 14 is responds to affection, the other variables of minor importance also seem to indicate a general responsiveness of affection, whether positive or negative. One gets the impression that a child at one extreme on the factor is intense in his affectionate reactions to adults and other children. The child at the other extreme is passive, inhibited, and shallow in his affectionate responses to adults and children. This factor is ninth in importance for the Basic Sample by virtue of the sum of the 61 squared factor loadings being 1.96.

Vanity

"Factor X" in Table 15 is the last one to attain the factor analytic criterion of an eigenvalue equal to or greater than 1.00. The sum of the 61 squared loadings for this factor is 1.64. The only variable with a large loading is vain. If one accepts two variables with at least moderate loadings as the minimum requirement for defining a factor, this set of variables and their loadings would not seem to meet the criterion.

Summary

The ten factor patterns, which have been described in order of their relative importance for the Basic Sample, are emotional reactivity, sociability, socialization, verbal creativity, confidence, achievement, affability, self-assertion, affection, and vanity. Taken together they constitute a description of basic personality patterns of children in a nursery school setting, at least as sampled by the 61 behavior ratings used in this study. In terms of psychological as well as mathematical considerations, the variables within each of the personality patterns or factors seem to go together. It may be, however, that there are names for these ten factors that are more appropriate than the ones chosen. This is not a major issue since the names for the behavior patterns are merely shorthand symbols. The final referent for a given personality pattern is always the weighted variables that constitute the factor.

Three of the personality patterns - - emotional reactivity, sociability, and socialization - - account for more variation in behavior (44 percent of the total variance) than do the remaining seven factors (35 percent). The first three factors are concerned with the behavior of children in contact with other children and adults in their social and physical milieu. During these ages the social circle of the child has broadened rapidly, having great influence on him for perhaps the first time in his life. Up to this point, the family has been the most important social instrument for the child.

The verbal creativity, confidence, and achievement personality patterns are of less importance in characterizing behavior in the nursery school, but they may be of greater predictive importance for academic success in the elementary and high schools. This issue is empirically investigated in Chapter VII.

Factors seven through nine -- affability, dominance, affection -- are again concerned with social psychological variables. The last factor, called vanity, is minor at the very most.

As noted earlier, the scores on each of the nine or ten behavior patterns are independent of those on the other eight or nine, at least at the empirical level at which the analyses of the data were done. Thus, if a child is high on one pattern, this does not preclude his being high on another. Alternatively, he may be low; the best guess is that on the other factor pattern he will be average.

If the preschool period is as important for personality development as some theories would have us believe, then the ten behavior patterns found at these ages may be extremely important indicators of later personality. These factor patterns do appear to be analogous to important aspects of behavior in adult life. If the variables that constitute these ten personality patterns persist at later stages of childhood and in different surroundings, the likelihood is increased that these personality traits will, on the average, continue to be characteristic of these individuals in adult life. A number of assumptions are necessary, in the absence of data, to extend these characteristics to adult life, even if it is found that they are stable throughout early and middle childhood.

Chapter III

Invariance of Behavior Patterns

Results were presented in the previous chapter from the analysis of data on the Basic Sample, the total group of 138 children, rated when they were between three and four and one-half years of age. The findings from such a study are valid and legitimate in their own right insofar as the methods meet acceptable canons of inquiry. However, of considerable interest is the question about the regularity of the patterns of behavior that were obtained. That is, what is the likelihood that these patterns of behavior could have resulted from two independent analyses of similar data obtained on separate samples of children? This is the matter to which the present chapter is devoted.

The question of factorial invariance is a matter of replicability of the factors obtained with any given sample of subjects, variables, and raters. In assessing factorial invariance in the present study, two different samples were used. They were obtained by dividing the children of the Basic Sample into two independent groups, the Early Invariance sample (EI), consisting of the 69 subjects on whom observations were made between 1930 and 1934, and the Late Invariance sample (LI), consisting of the 69 subjects on whom data were obtained from 1934 to 1938. The data for each group were then factor

Table 16

Coefficients of Factor Invariance* - Early and Late Invariance Loadings**

		Late							
		I	II	III	IV	V	VI	VII	VIII
Early	I	-.110 .141	.960 .959	.147 .058	.047 .050	-.130 -.117	.102 .095	.237 .107	-.254 .050
	II	.843 .915	-.157 .012	-.244 -.155	.274 .106	.306 -.039	.242 -.011	.408 .196	.061 -.021
	III	-.183 -.584	-.049 -.075	.030 -.036	-.056 -.160	.372 .182	.812 .740	.246 .028	.080 .061
	IV	.124 .200	-.016 .148	.623 .680	-.283 -.301	-.000 .099	-.165 -.222	-.080 -.034	.563 .488
	V	.023 -.031	.124 .152	-.018 .108	.440 .284	.778 .850	-.090 -.310	.025 -.128	-.056 -.022
	VI	.059 .015	-.001 .023	.194 .157	.703 .822	-.138 -.403	.101 .196	-.198 -.172	.261 .144
	VII	.346 .462	.091 .290	.198 .330	-.218 -.240	.231 .416	.276 .204	-.110 -.104	.021 .057
	VIII	-.052 -.132	-.109 .189	-.278 -.085	.192 .217	-.034 .014	.157 .227	.013 -.011	.570 .713
	IX	-.119 -.174	-.021 -.240	.596 .815	.132 .224	-.047 -.022	.085 .068	.073 .115	-.329 -.198
	X	.024 -.045	-.035 -.104	.035 .100	.091 .027	.083 -.020	-.019 -.217	.706 .881	.091 .000
	XI	-.180 -.491	.053 .088	-.010 -.152	-.088 -.390	.185 .484	-.232 -.211	-.135 -.139	.187 .142
	XII	.196 .393	.012 .182	-.001 -.110	-.057 -.125	.114 .162	.134 .173	-.311 -.519	-.060 -.148

*Varimax Rotation

**Upper figures are for Early Invariance Sample, Lower figures are for Late Invariance Sample.

analyzed separately. Insofar as the factors isolated for the entire sample were stable, it could be expected that they would be found in independent sub-samples of the entire group. The two invariance analyses are, of course, not independent of the total analysis of the Basic Sample, but they are independent of one another.

In comparing the outcomes of the two separate analyses, the coefficients of factor invariance (Pinneau and Newhouse, 1964) are considered before taking up the factors individually for the two analyses. For reasons that become obvious as one examines the factors obtained from the analyses, a frame of reference throughout the balance of the report is the set of factors that were obtained with the Basic Sample.

An inspection of the coefficients of factor invariance (see Table 16) that were obtained from relating the factors for the EI and LI samples, reveals both similarities and differences between the two groups. (The upper coefficient of each pair was obtained using the EI data matrix; the lower coefficient was obtained using the LI data matrix). The discussion which follows is anticipated by noting that the major factors obtained in the analysis of the Basic Sample are found in both invariance groups. The coefficient of invariance is a Pearson product-moment correlation coefficient between factor scores, reflecting the relationship between the factors obtained in the analyses of the two

Table 17

Variable	Invariance Samples Early Factor I	 Late Factor II
40. Popular	.866	.881
38. Friendships close, intimate	.859	.879
37. Social, not solitary	.853	.816
43. Cooperates with group	.823	.834
44. Leads others	.772	.746
59. Rarely a spectator	.731	.735
48. Active	.700	.625
9. Enthusiastic	.693	.638
46. Persuasive	.679	.651
50. Numerous interests	.665	.787
49. Vigorous	.629	.520
47. Expressive voice	.572	.540
42. Responds to social pressure	.569	.369
53. Deliberates	-.540	-.396
7. Smiles, laughs	.522	.396
23. Initiates play	.519	.674
8. Pleasant facial expression	.504	.154
21. Competitive	.477	.595
60. Adjusts to new situation	.296	.508
Sum of squared loadings for all variables	10.412	10.641

Minimum value which variable must load on one or the other factor, .500.

invariance samples. This measure employs the loadings of all variables on a factor on the two occasions and one or the other of the two original data matrices (Pinneau and Newhouse, 1964). For comparative purposes, first one data matrix and then the other is used in computing coefficients of factor invariance in this study. All eight factors of the LI sample are clearly related to factors of the EI sample. Some EI factors are unrelated to LI factors, apparently because of the different numbers of factors involved: Twelve factors in the EI sample meet the criterion of an eigenvalue equal to or greater than 1.00, while only eight factors in the LI sample meet this criterion.

The format used in discussing the similarities and differences between factors focuses on both the variables that load highly on similar factors from the separate analyses, and those variables that load high on either the EI or LI factors.

Sociability

The sociability factor appears as the most important factor in the EI analysis and the second most important factor in the LI group. The only deviation of any magnitude from one analysis group to the other (see Table 17) is for the characteristic pleasant facial expression, with a loading for the Early sample of .504 and a loading of .154 for the Late sample.

Table 18

Variable	Invariance Samples	
	Early	Late
	Factor II	Factor I
1. Overt emotion is easily aroused	.870	.788
5. Aroused when thwarted by inanimate objects	.826	.759
16. Aroused by thwarting from children	.823	.868
4. Cries	.794	.500
5. Lacks inhibition	.787	.778
2. Overt emotion is turbulent, violent	.755	.778
17. Aroused by thwarting from adults	.755	.771
22. Maintains own rights	.708	.774
27. Negativistic	.655	.642
31. Unselfish	-.634	-.769
13. Does not pout	-.578	-.154
14. Displays temper	.577	.882
20. Acquisitive	.530	.859
14. Does not whine	-.503	-.423
25. Bosses	.470	.638
19. Aggressively combative	.432	.799
30. Kind	-.355	-.624
49. Vigorous	.282	.663
34. Respectful of other's rights	-.261	-.746
53. Deliberates	-.250	-.691
24. Teases	.199	.627
51. Ambitious	.194	.550
32. Dependable	-.167	-.635
10. Reckless, carefree	.148	.514
48. Active	.141	.546
26. Bullies	.128	.724
21. Competitive	.050	.619
Sum of squared loadings for all variables	9.824	15.946

Minimum value which variable must load on one or the other factor, .500.

Differences in the other loadings that occur are not major and do not create a difference between the two factors involved; both coefficients of invariance are .96. This dimension appears highly and similarly important in both analyses: For the EI group, the sum of squared factor loadings is 10.41, the analogous figure for the LI group is 10.64.

Emotional Reactivity

A pattern of factor loadings which appeared for the EI and LI samples that is very similar to one appearing for the Basic Sample is presented in Table 18. As for the Basic Sample, the factor has been tentatively identified as emotional reactivity, since most of the high loading variables deal with expression of emotion. In terms of the sum of squared factor loadings, emotional reactivity for the EI sample was 9.82 and for the LI sample it was 15.95. The sum of the loadings for both groups indicate that emotional reactivity is an important aspect of covariation in the individual differences of nursery school children, even though there are some discrepancies between the size of the loadings for the two samples on a number of variables. An inspection of the variables for which the discrepancies are smallest and greatest, the first and last parts of the table respectively, suggests that the differences are chiefly

Table 19

Variable	Invariance Samples Early Factor III	 Late Factor VI
32. Dependable	.876	.601
34. Respectful of other's rights	.827	.408
24. Teases	-.727	-.484
26. Bullies	-.714	-.410
30. Kind	.691	.583
33. Responsible	.646	.582
19. Aggressively combative	-.437	-.337
12. Not sensitive	-.389	-.523
42. Responds to social pressure	.388	.653
27. Negativistic	-.296	-.423
Sum of squared loadings for all variables	5.355	3.748

Minimum value which variable must load on one or the other factor, .400

in terms of correlated manifestations rather than in a change in the patterning of the more overt, open emotional reactions. While these differences are apparent, the high degree of basic similarity of the dimensions is shown by the coefficients of factor invariance, .84 and .92.

Socialization

The loadings for the EI and LI samples are given in Table 19. Casual inspection of these sets of loadings may suggest that there is a substantial change in the dimension. The coefficients of factor invariance, .81 and .74, suggest that this is not the case. A closer examination of Table 19 indicates that the configuration for the two sets of loadings is quite similar despite the generally smaller values for the factor obtained with the LI data.

Confidence and Affability

Factors that seemed to assess confidence and affability independently appeared in the analyses of the Basic Sample; similar separate factors also appeared in the EI analyses. In the LI sample, however, these two factors merged into one that seems to represent a dimension of affability and confidence combined. This factor, third in importance for the LI group (cf. Table 20) contains all of the variables in Factor IV, the confidence dimension of the EI group, and all except two of the variables making up affability, Factor

Table 20

Variable		Invariance Samples		
		Early	Late	Late
		Factor IV	Factor III	Factor VIII
11.	Free from apprehension	.879	.612	.482
12.	Not sensitive	.748	.411	.392
60.	Adjusts to new situations	.712	.677	.254
41.	Rarely embarrassed	.612	.457	.398
35.	Self-reliant	.534	.521	.037
3.	Emotion is persistent	-.449	-.385	-.320
10.	Reckless, carefree	.424	.563	.103
36.	Friendly	.321	.495	.147
8.	Pleasant facial expression	.200	.810	-.021
7.	Smiles, laughs	.175	.574	-.030
9.	Enthusiastic	.162	.424	-.079
14.	Does not whine	.125	.512	-.146
13.	Does not pout	.092	.752	-.153
4.	Cries	-.092	-.479	.084
28.	Vain	-.082	-.100	.624
6.	Agreeable, good-natured	.042	.655	-.065
Sum of squared loadings for all variables		4.253	6.250	1.809

Minimum value which variable must load on one of the factors, .400.

IX in the EI group (cf. Table 24). In addition to containing the variables from these two EI factors, the LI affability and confidence dimension contains the variable cries, a scale which does not load even moderately on either of the contributing factors. The two variables bosses and negativistic load moderately on the affability factor in the EI analysis but do not load on the composite factor in the LI group. The coefficients of invariance for Factor IV of the EI group and Factor III of the LI group are .62 and .68.

The coefficients of factor invariance for Factor IV of the EI sample and Factor VIII of the LI group are also substantial, .56 and .49. While inspection of these factors in Table 20 indicates some degree of similarity, later comparison indicates Factor VIII bears a closer resemblance to Factor VIII of the EI group.

Achievement

This dimension has its counterpart in both EI and LI analyses, and in both it is fifth in importance. As Table 21 shows, the factor differs to some extent from the EI to the LI samples; this difference, however, does not appear to change the nature of the dimension that has been isolated, a position supported by the high coefficients of factor invariance, .78 and .85. The achievement dimension for the

Table 21

Variable	Invariance Early Factor V	Samples Late Factor V
52. High standards in work and play	.726	.852
58. Original	.721	.358
54. Concentrates	.660	.792
57. Imaginative	.638	.362
23. Initiates play	.538	.206
51. Ambitious	.462	.288
44. Leads others	.431	.195
61. Free from nervous habits	.139	.568
55. Perseveres	.301	.602
Sum of squared loadings for all variables	4.107	3.960

Minimum value which variable must load on one or the other factor, .400.

Table 22

Variable	Invariance Early Factor VI	Samples Late Factor IV
45. Talkative	.784	.802
56. Curious	.707	.621
36. Friendly	.561	.452
41. Rarely embarrassed	.522	.297
29. Bids for attention	.468	.692
25. Bosses	.331	.424
58. Original	.290	.550
47. Expressive voice	.290	.487
57. Imaginative	.224	.628
Sum of squared loadings for all variables	5.622	4.578

Minimum value which variable must load on one or the other factor, .400.

EI sample is embellished with more obvious expression of originality and imagination, of leadership and ambition. In the LI sample, the achievement dimension has more marked overtones of perseverence and freedom from nervous habits. In neither case are there reversals in the signs of loadings on variables meeting the cutoff criterion.

Verbal Activity and Creativity

A verbal activity factor is found in both the EI and LI groups (see Table 22). The core or marker variables in both analyses are talkative, curious, bids for attention, and friendly. In addition to these variables, the factor from the EI analysis contains a moderately high loading for rarely embarrassed, .522, while the comparable loading on the LI analysis was .297. This factor emerges in larger form in the LI sample, placing fourth in importance as compared with sixth for the EI group, and contains several variables loading from moderate to high that are not contained to the same magnitude in the factor for the first sample. These variables are imaginative, original, expressive voice. It is recalled that these variables were also important for this factor in the Basic Sample where the factor was called verbal creativity. Even though loading moderately or lower on the EI factor, the loadings are in the same direction and hence do not change substantially the interpretation given

Table 23

Variable	Invariance	Samples
	Early	Late
	Factor VIII	Factor VIII
28. Vain	.812	.624
51. Ambitious	-.394	-.016
48. Active	-.384	-.188
10. Reckless, carefree	-.383	.103
49. Vigorous	-.358	-.147
25. Bosses	.335	.196
50. Numerous interests	-.322	.052
23. Initiates play	-.321	-.085
46. Persuasive	.113	-.353
12. Not sensitive	-.072	.392
3. Emotion is persistent	.014	.320
47. Expressive voice	-.002	.353
11. Free from apprehension	.001	.482
41. Rarely embarrassed	.031	.398
Sum of squared loadings for all variables	2.677	1.809

Minimum value which variable must load on one or the other factor, .300.

this factor. The coefficients of factor invariance are .70 and .82.

Vanity

Factor VIII in the EI analysis and Factor VIII in the LI analysis are both characterized by vain as the highest loading variable. The determining contribution of this variable to both factors is shown by the sizable coefficients of factor invariance, .57 and .31. Table 15 shows that these different shadings for the factor are not evident in the data analysis of the Basic Sample, the factor vanity being almost wholly determined by the variable vain. The relation of this factor for the LI group to Factor IV of the EI sample has already been noted (cf. Table 16 and 20).

Affability

The relation of Factor IX of the EI sample, affability, to Factor III of the LI sample, a composite of affability and confidence has already been discussed (p. 48). A direct comparison of these two factors is presented in Table 24. The coefficients of factor invariance are .60 and .82. As implied in the earlier discussion, the dimension of affability obtained in the EI sample more closely resembles the comparable one from the Basic Sample than does LI Factor III.

Table 24

Variable	Invariance	Samples
	Early	Late
	Factor IX	Factor III
8. Pleasant facial expression	.660	.810
6. Agreeable, good natured	.582	.655
13. Does not pout	.518	.752
7. Smiles, laughs	.438	.574
14. Does not whine	.393	.512
27. Negativistic	-.348	-.154
25. Bosses	-.322	.024
3. Emotion is persistent	-.296	-.385
9. Enthusiastic	.244	.424
47. Expressive voice	.234	.341
48. Active	.209	.319
10. Reckless, carefree	.158	.563
36. Friendly	.158	.495
60. Adjusts to new situation	.129	.677
4. Cries	.089	-.479
12. Not sensitive	.078	.411
35. Self-reliant	.071	.521
58. Original	.044	.322
11. Free from apprehension	-.035	.612
41. Rarely embarrassed	.026	.457
Sum of squared loadings forall variables	2.367	6.250

Minimum value which variable must load on one or the other factor, .300.

Table 25

Variable	Early Invariance Factor X	Late Invariance Factor VII
39. Responds to affection	.814	.800
27. Negativistic	.248	.341
17. Aroused by thwarting from adults	.232	.394
33. Responsible	-.075	-.337
Sum of squared loadings for all variables	1.906	2.120

Minimum value which variable must load on one or the other factor, .294.

Affection

A dimension that seems to represent response to affection from adults appears both in the LI and EI analyses; the coefficients of factor invariance are .70 and .88. In both instances, the scale responds to affection is almost completely determining (cf. Table 25). In both analyses the factor meets the criterion of an eigenvalue of at least 1.00. A factor parallel to the somewhat more complete factor obtained in the LI analysis was found in the analysis of the Basic Sample (Table 14).

Additional Factors

Factor VII in the EI analysis does not have a counterpart in the LI group. This factor does, however, appear in the analysis of the Basic Sample, and both in that analysis and in this it would appear to be interpretable as a dimension of self-assertion. This factor is presented in Table 26.

Two additional factors in the EI analyses meet the analytic criterion of inclusion, an eigenvalue of 1.00, while at the same time they are apparently rather unimportant dimensions. These factors are also presented in Table 26. With so few substantial loadings they would pose considerable difficulty in interpretation. However, tentatively these factors have been identified as composure and

Table 26

Variable	Invariance Sample Early Factor VII
21. Competitive	.706
19. Aggressively combative	.566
55. Perseveres	.433
49. Vigorous	.408
35. Self-reliant	.402
Sum of squared loadings for all variables	2.809

Minimum value which variable must load on the factor, .400

Variable	Invariance Sample Early Factor XI
61. Free from nervous habits	.848
18. Displays temper	-.585
Sum of squared loadings for all variables	1.610

No other loading above .22

Variable	Invariance Sample Early Factor XII
20. Acquisitive	.651
55. Perseveres	.379
Sum of squared loadings for all variables	1.468

No other loading above .28

acquisitiveness, respectively.

Discussion and Conclusion

The results indicate a good deal of correspondence between the analyses for the EI and LI groups. A number of factors appear distinctly in both analyses - - sociability, emotional reactivity, socialization, verbal creativity, and achievement - - while the factors of confidence and affability from the EI analysis appear in fused form in the LI group. Confidence and affability in the EI sample thus became one factor in the LI group.

The coefficients of factor invariance represent substantial relationships between similar factors in the separate analyses. The pattern of these coefficients as well as the descriptive content of the factors, indicates substantial invariance of factorial structure for the two samples.

Based on these findings it is believed that, especially in the case of the major factors, the dimensions of behavior isolated for the Basic Sample are not attributable to idiosyncrasies in the specific data analyzed, whether such idiosyncrasies can be attributed to the subjects, the specific circumstances of gathering these data, etc. The invariance studies show substantial agreement in factors over two separate groups of children from the Basic Sample.

Chapter IV

Sex Similarities and Differences in Behavior Patterns

The results obtained on the Basic Sample of three and four year old nursery school children represent one of the first broad studies of behavior patterns of such young children. In the preceding section on the invariance of behavior patterns, two samples of three to four year old nursery school children were compared and substantial similarity between the behavior patterns was found.

In the studies thus far considered, the analysis of behavior patterns was based on approximately an equal number of boys and girls. It is possible that a given factor was contributed only by the subjects of one sex, or that an obtained factor represents a compromise between somewhat different behavior patterns of boys and girls. It is also possible that a behavior pattern of small importance for one sex may be unidentifiable when the data for boys and girls are combined. This chapter deals with the question of sex similarities on two levels: (1) What are the behavior patterns that are found separately for boys and for girls? (2) How are these two sets of patterns comparable to one another? To examine these questions the data for the boys and girls in the Basic Sample were analyzed separately.

To provide an overall perspective, it is first

Table 27

Coefficients of Factor Invariance* - Male and Female Loadings**

						Girls					
		I	II	III	IV	V	VI	VII	VIII	IX	X
Boys	I	.001 .026	.241 .356	.914 .839	.287 .148	-.144 -.152	.343 .238	.152 .046	-.027 -.009	.222 .205	-.260 -.080
	II	.838 .931	.285 .183	-.082 -.084	-.199 -.050	.075 .087	.279 .139	.042 .060	-.065 -.014	-.287 -.088	-.325 .017
	III	-.259 -.326	-.093 -.254	.188 .162	-.009 -.153	.848 .821	.116 .171	.303 .018	.342 .096	-.103 -.127	.115 -.065
	IV	.190 .359	.055 .224	-.048 -.006	.457 .591	.324 .231	.268 .234	-.022 -.160	.213 .330	.510 .340	.263 .116
	V	-.179 -.083	-.059 -.088	-.017 -.143	.750 .787	-.217 -.219	.376 .223	.232 -.098	-.100 -.018	-.382 -.280	-.008 .136
	VI	-.334 -.510	-.465 .224	-.100 .014	-.056 -.112	.076 .207	.277 .398	-.244 -.035	-.701 -.603	-.156 -.111	.070 .037
	VII	-.072 -.029	.364 .435	-.139 -.208	.011 -.082	.131 -.024	.080 -.148	.795 .795	.038 -.165	.056 .238	.068 -.028
	VIII	.039 .186	-.592 -.589	.111 .064	.119 -.032	.091 .102	-.103 -.022	.139 .239	-.065 -.369	.320 .152	.542 .508
	IX	-.073 -.186	-.022 .047	-.120 -.092	-.120 -.254	-.081 -.076	.554 .770	.056 -.047	.257 .220	.248 .208	.050 .102
	X	.103 .405	.107 .128	.137 .331	.134 .392	.164 .060	-.259 -.183	-.174 -.345	-.230 -.171	-.042 -.059	.299 .393

*Varimax Rotation

**Upper figures are for Male Sample, lower figures are for Female Sample.

appropriate to present data relevant to the second question, the comparability of the factors obtained for the separate analyses. Then the content of the factors will be presented, discussing the similarities and differences across the sexes, and the comparison of these factors to those presented in earlier chapters.

Table 27 presents the coefficients of factor invariance between the male and female nursery school children. As before, the elements in the matrix may be interpreted descriptively as correlation coefficients. At a glance it can be seen in Table 27 that there are high to moderate positive coefficients of factor invariance between the males and females for at least eight of the factors. The other two factors have at least a low positive relationship.

The factor analyses of the two sets of data thus yielded highly similar behavior patterns or factors for the boys and girls. For each pair of factors moderately to highly related, a table providing a comparison of the two groups in terms of factor loadings is presented with the discussion. The behavior scales are presented in order of the rank of the loadings in the analysis of the boy's data.

Sociability

Table 28 presents the factor previously identified as sociability. The four variables with the highest loadings

Table 28

Variable	Boys Factor I	Girls Factor III
37. Social, not solitary	.877	.770
59. Rarely a spectator	.869	.331
44. Leads others	.864	.375
38. Friendships close, intimate	.855	.882
40. Popular	.850	.816
50. Numerous interests	.838	.502
43. Cooperates with group	.805	.859
23. Initiates play	.779	.242
48. Active	.773	.526
9. Enthusiastic	.768	.484
46. Persuasive	.717	.384
49. Vigorous	.688	.385
51. Ambitious	.684	.388
47. Expressive voice	.662	.328
53. Deliberates	-.604	-.257
21. Competitive	.562	.458
10. Reckless, carefree	.516	.158
7. Smiles, laughs	.505	.311
42. Responds to social pressure	.442	.633
Sum of squared loadings for all variables,	12.933	6.044

Minimum value which variable must load on one or the other factor, .500.

for both boys and girls are social, friendships close, popular, and cooperates with group. Most of the other variables loading high on this factor for both boys and girls also appeared on the sociability factor for the Basic and Invariance Samples. While it appears that sociability is a behavior pattern common to girls and boys, there are some sex differences in the attributes which make up this dimension. For example, leads others, numerous interests, initiates play, enthusiastic, active, etc., all tend to be more important in characterizing the sociability pattern for boys than for girls. Thus, relative to other factors, sociability appears to be of more importance for boys than for girls. The sociability factor is the highest in importance of the ten obtained in the case of the boys (sum of squared loadings equals 12.93), while in the case of the girls, the factor is third in importance (sum of squared loadings equals 6.04). Nevertheless, as seen in Table 27, the coefficients of factor invariance for the boys and girls on sociability are .91 and .84, among the highest for the factors.

Emotional Reactivity

From Table 29 it can be seen that the variables with consistently large loadings for both boys and girls are those dealing with overt emotion, thwarting, and lacking inhibition. This dimension appears to be a factor of

Table 29

Variable	Boys Factor II	Girls Factor I
1. Overt emotion is easily aroused	.790	.822
16. Aroused by thwarting from children	.783	.867
15. Aroused when thwarted by inanimate objects	.771	.847
2. Overt emotion is turbulent, violent	.745	.767
5. Lacks inhibition	.633	.757
22. Maintains own rights	.629	.662
18. Displays temper	.608	.678
19. Aggressively combative	.576	.528
20. Acquisitive	.560	.811
31. Unselfish	-.546	-.771
17. Aroused by thwarting from adults	.539	.760
49. Vigorous	.502	.417
4. Cries	.481	.684
25. Bosses	.463	.680
27. Negativistic	.410	.631
34. Respectful of others rights	-.343	-.606
6. Agreeable, good-natured	-.264	-.512
14. Does not whine	-.216	-.596
26. Bullies	.194	.555
29. Bids for attention	.154	.556
45. Talkative	.123	.531
Sum of squared loadings for all variables,	8.126	13.093

Minimum value which variable must load on one or the other factor, .500.

emotional reactivity comparable to those identified for the Basic Sample and the Invariance Samples. Such differences as are present take the form of higher loadings for the girls than for the boys. The higher loadings on attributes of selfish and acquisitive give this factor a cast of possessiveness for the girls, while fusion also with control is suggested by higher loadings for the boys on bosses and negativistic. The emotional reactivity factor is first in importance for the girls (sum of squared loadings, 13.09) and second in importance for the boys (sum of squared loadings, 8.14). This relative difference in importance might be expected in view of the broader nature of the pattern for the girls. Despite evident differences between the sexes in the constellation of this factor, the coefficients of factor invariance are .84 and .93, indicating a high degree of similarity in the basic dimension.

Socialization

The configuration of variables and their loadings in Table 30 for a third factor appears similar for boys and girls: The coefficients of factor invariance for this dimension are .85 and .82. High loadings on the behavior scales of dependable, kind, respectful of others' rights, does not tease, does not bully, etc., suggest an organization

Table 30

Variable	Boys Factor III	Girls Factor V
32. Dependable	.893	.653
30. Kind	.806	.657
34. Respectful of others rights	.793	.585
24. Teases	-.762	-.479
26. Bullies	-.675	-.516
33. Responsible	.660	.762
42. Responds to social pressure	.627	.410
31. Unselfish	.546	.197
27. Negativistic	-.484	-.291
22. Maintains own rights	-.440	-.241
12. Not sensitive	-.421	-.564
19. Aggressively combative	-.357	-.545
Sum of squared loadings for all variables	6.588	4.390

Minimum value which variable must load on one or the other factor, .400.

Table 31

Variable	Boys Factor IV	Girls Factor IX
45. Talkative	.808	.148
56. Curious	.739	.236
58. Original	.702	.462
57. Imaginative	.685	.625
36. Friendly	.587	-.025
29. Bids for attention	.569	.007
47. Expressive voice	.440	.364
41. Rarely embarrassed	.420	.139
51. Ambitious	.348	.104
60. Adjusts to new situations	.327	-.070
7. Smiles, laughs	.322	.184
39. Responds to affection	.305	-.000
25. Bosses	.303	.126
44. Leads others	.117	.380
Sum of squared loadings for all variables,	5.013	2.091

Minimum value which variable must load on one or the other factor, .300.

of behavior concerned with the manner in which societal and cultural norms are expressed. Perhaps Ausubel (1958; p. 289 ff) would call this socialization dimension a "satellization" factor while some psychologists might describe it as a measure of superego functioning.

In terms of the sum of the 61 squared factor loadings, the socialization pattern is third largest for boys (6.59) and girls (4.39).

Verbal Creativity

The factor shown in Table 31 for boys and girls seems to be a dimension of verbal creativity. A child at one pole of this factor is talkative, curious, original, imaginative, attention seeking, and has an expressive voice, while a child at the other extreme is relatively silent, does not ask for information, seek attention, or show verbal originality. This factor appears to be relatively unimportant for the girls (sum of squared factor loadings equals 5.01) in accounting for variance in the 61 behaviors. It is fourth largest for boys, and ninth largest for girls. The relationships between these two factors for the boys and girls are .51 and .34

Confidence

The variables and their loadings which form another factor pattern for both boys and girls are presented in

Table 32

Variable		Boys	Girls
		Factor V	Factor IV
11.	Free from apprehension	.796	.666
60.	Adjusts to new situations	.705	.655
12.	Not sensitive	.655	.532
41.	Rarely embarrassed	.613	.736
3.	Emotion is persistent	-.590	-.368
36.	Friendly	.400	.511
45.	Talkative	.229	.628
24.	Teases	.213	.441
46.	Perseveres	.177	.580
56.	Curious	.113	.630
59.	Rarely a spectator	.099	.497
23.	Initiates play	.010	.406
Sum of squared loadings for all variables		3.931	6.006

Minimum value which variable must load on one or the other factor, .400.

Table 32. The loadings for the first five variables -- free from apprehension, adjusts to new situations, not sensitive, rarely embarrassed, and emotion is persistent, are similar and indicate a dimension of confidence, or, focusing on the opposite pole of the factor, anxiety. Starting with the sixth variable, friendly, and continuing on down in the table, girls consistently have higher loadings than boys. None of these loadings drop below .37 for the girls; the median loading for all 12 variables is about .31 for the boys. For the girls, the confidence factor looms fourth in importance as indicated by the sum of squared factor loadings (6.01) while for the boys it is fifth in magnitude (3.93).

The coefficients of factor invariance between the boys and the girls factors are .75 and .79, indicating that the factors are highly similar for the sexes.

Affection

Looking back in Table 27, it can be seen that what is called an affection dimension for the boys and girls has coefficients of factor invariance of -.70 and -.60. In the case of the boys (Table 33) the signs of the factor loadings may all be changed to give the factor the same direction as for the girls. If this is done, the signs for the coefficients of factor invariance should also be changed. An affection

Table 33

Variable	Boys Factor VI	Girls Factor VIII
13. Does not pout	.664	-.262
39. Responds to affection	-.637	.811
14. Does not whine	.623	-.062
17. Aroused by thwarting from adults	-.527	.308
4. Cries	-.514	.271
27. Negativistic	-.514	.204
18. Displays temper	-.482	.140
5. Lacks inhibition	-.470	.239
35. Self-reliant	.400	-.233
29. Bids for attention	-.323	.395
61. Free from nervous habits	.208	-.310
10. Reckless, carefree	.141	.368
Sum of squared loadings for all variables	3.494	2.322

Minimum value which variable must load on one of the factors, .300.

Table 34

Variable	Boys Factor VII	Girls Factor VII
54. Concentrates	.729	.836
52. High standards in work and play	.717	.685
61. Free from nervous habits	.707	.574
55. Perseveres	.439	.226
29. Bids for attention	-.342	-.346
35. Self-reliant	.319	.147
53. Deliberates	.292	.435
58. Original	.287	.326
59. Rarely a spectator	.136	.322
Sum of squared loadings for all variables	3.176	3.115

Minimum value which variables must load on one or the other factor, .300.

factor has also been identified for the Basic and Invariance samples. In the present study the sum of the 61 squared factor loadings for the boys is 3.49 and is the sixth largest for them. For the girls it is a smaller factor; the sum of the squared loadings is 2.32 and is eighth largest. With the signs for the boys reversed, Table 33 shows moderately large negative loadings for the boys on variables 13 and 14, and high to low loadings for both boys and girls on responds to affection, aroused by thwarting from adults, cries, negativistic, bids for attention, etc.

Achievement

Table 34 presents the pattern of variables and their loadings that contribute one of the least readily identifiable factors that the boys and girls have in common. However, the relationships between these, the seventh factors in Table 27, are .80 and .80 for the boys and girls. With high loading on variables such as concentrates, high standards in work and play, etc., it appears that this factor is appropriately termed achievement. In terms of accounting for a large proportion of the variance in the two matrices, this factor in both samples is of fairly small importance at this age level, at least as obtained on the behavior scales employed in this study. For both boys and

Table 35

Variable	Boys	Girls	
	Factor VIII	Factor II	Factor X
28. Vain	.701	-.152	.886
19. Aggressively combative	-.519	.458	-.037
55. Perseveres	-.500	.785	-.027
10. Reckless, carefree	-.409	.499	-.096
35. Self-reliant	-.378	.774	.034
21. Competitive	-.365	.517	.041
4. Cries	.364	-.222	-.014
22. Maintains own rights	-.295	.505	-.179
49. Vigorous	-.278	.587	-.125
51. Ambitious	-.198	.718	-.112
11. Free from apprehension	-.103	.430	.055
48. Active	-.099	.544	-.146
59. Rarely a spectator	-.090	.483	-.232
50. Numerous interests	-.089	.506	-.150
18. Displays temper	-.028	.224	.402
23. Initiates play	-.020	.572	-.168
58. Original	-.012	.540	.017
44. Leads others	.009	.553	.120
Sum of squared loadings for all variables	2.441	7.303	1.724

Minimum value which variable must load on one or the other factor, .400.

girls the achievement factor has the seventh largest sum of squared factor loadings, 3.18 and 3.12, respectively. Despite its apparent small importance in accounting for the variance in behavior at this age level in the nursery school setting, its appearance in the data of both samples suggests it is a stable behavioral pattern.

Assurance and Self-assertion

From examining the factor patterns in Table 35, it can be seen that Factor VIII for the boys (with the loadings reflected) and Factor II for the girls are somewhat similar in the variables aggressively combative, perseveres, reckless, self-reliant, competitive, maintains own rights, and vigorous. The boys, but not the girls, have a high loading on vain. On the other hand, the girls have moderate loadings on the variables active, numerous interests, rarely a spectator, initiates play, original, and leads others. It appears that this factor might be very tentatively identified as assurance, or self-assertion as a fairly similar factor in the Basic Sample was named. What ever the variables have in common, the coefficients of factor invariance for the dimension are -.59 and -.59. In terms of the 61 squared factor loadings, for the boys it is 2.44 and is the eighth largest. For the girls it is 7.30 and is the second largest, making it considerably more important for them than for the

Table 36

Variable	Boys	Girls
	Factor IX	Factor VI
8. Pleasant facial expression	.594	.869
7. Smiles, laughs	.552	.617
20. Acquisitive	-.465	-.006
6. Agreeable, good-natured	.368	.648
18. Displays temper	.270	.015
13. Does not pout	.252	.608
11. Free from apprehension	.200	.121
3. Emotion is persistent	.172	-.396
9. Enthusiastic	.171	.457
10. Reckless, carefree	.161	.388
47. Expressive voice	.109	.439
36. Friendly	.074	.498
60. Adjusts to new situations	-.068	.372
48. Active	.055	.314
14. Does not whine	.052	.508
53. Deliberates	-.015	.320
Sum of squared loadings for all variables	1.812	4.375

Minimum value which variable must load on one or the other factor, .300.

boys. The relation of this factor for the boys to Factor X for the girls, vain, should also be noted; the coefficients of factor invariance are .54 and .51.

Affability

Table 36 indicates that the loadings on this factor, called affability, are much larger for the girls than for the boys. Its relatively greater importance for the girls is also shown in a comparison of the sum of the squared loadings for the two groups, 4.38 and 1.81, respectively. The factor is the sixth largest for the girls and ninth largest for the boys; the coefficients of factor invariance between them are .55 and .77.

Authority and Vanity

The coefficients of factor invariance for the last dimension for the boys and for the girls are .30 and .39. The factor is presented in Table 37. With moderate to low loadings for the boys on the variables bosses, competitive, bullies, persuasive, and responsible, it appears that this factor might be very tentatively identified as authority. Boys with high scores on these variables might be some of the leaders among the groups in nursery school. Also they could be little tyrants among their peers. Boys with low scores are described as meek and mild persons who follow leaders or are pushed around by their peers. For the boys

Table 37

Variable	Boys Factor X	Girls Factor X
25. Bosses	.519	.134
21. Competitive	.442	.041
26. Bullies	.429	.219
46. Persuasive	.356	.112
33. Responsible	.300	.150
3. Emotion is persistent	.109	-.317
18. Displays temper	.075	.402
28. Vain	.037	.886
Sum of squared loadings for all variables	1.440	1.724

Minimum value which variable must load on one or the other factor, .300.

the authority factors had the lowest sum of 61 squared loadings, being only 1.44.

Factor X for the girls also appears in Table 37. The variable vain has a high loading, and there are low to moderate loadings on the variables displays temper, and emotion is persistent. At least at this age, this factor appears to be fairly specific for girls and accounts for little of the covariation in their behavior.

In terms of face validity, these factors bear little of the relationship indicated by the empirical measures. It should be recalled that this factor for the girls is more highly related to Factor VIII for the boys; (cf. Tables 27 and 35). In looking at the loadings on each variable for these two factors it appears that much of this relationship between the two factors is carried by the high loading that vain has on both factors. Vain accounts for 20 percent of the sum of squared loadings on Factor VIII for the boys and for 45 percent of the sum of squared loadings on Factor X for the girls.

Summary

The ten factors identified for the Basic Sample were also identified in the results from separate analyses of data on the girls. The ten common factors are sociability, emotional reactivity, socialization, verbal activity (creativity), confidence, affection, achievement, assurance (self assertion), affability, and vanity. For the boys, the last of these factors did not appear in such unadulterated form as for the girls, or as it did in the Basic Sample.

Differences in the importance of these ten behavior patterns for boys and girls are indicated by the amount of variance accounted for by each factor. In the case of the boys, the sociability, socialization, verbal creativity, and affection factor patterns accounted for a larger proportion of the variance than they did for the girls. For the girls the emotional reactivity, confidence, affability, and assurance factor patterns contributed a larger proportion of the variance than for the boys. The achievement factor pattern contributed about an equal proportion of the variance for both sexes.

In addition, there was one identifiable factor, authority, which was not clearly evident in the analysis of the girls' data or in the analysis of data on the Basic Sample.

Part II: Longitudinal Studies

Chapter V

Consistency of Behavior Patterns: Age 3 to 4-1/2 Years

The same set of ratings on different children has been considered from a number of different vantage points in the previous chapters of this monograph. This chapter addresses itself to two questions: First, how comparable are behavior patterns for the same nursery school children at ages three and four and one-half years? This question is highly important as a capstone to the results presented thus far. Second, how consistent are children in the extent to which they display these different behaviors over this period of a year and one-half? Examination of the consistency of behavior patterns from age three to four and one-half years provides a longitudinal view of the personality development of the same children.

The findings obtained from data on the Basic Sample present the broadest view of the personality organization of children during their attendance at the Institute Nursery School. When the Basic Sample was divided into those children who attended nursery school in the first four years of the study versus those from the second four years, essentially the same behavior patterns were obtained. The findings that the same basic behavior groupings were present in two different samples rated approximately four years apart indicates that the behavior clusters did not arise by chance. In these analyses differences among the subjects in sex, socio-economic level, physical and mental maturing and other variables were ignored. If any one of the behavior patterns obtained were closely related to relative standing on any one of these additional variables, the factor would become exceedingly small or would disappear if the subjects were divided into fairly homogeneous groups with respect to their standing on it. This became evident when the Basic Sample was divided into two groups on the basis of sex rather than on the basis of years in which the ratings were made. Almost all of the same behavior patterns were obtained for boys and girls. Yet, somewhat different manifestations were evident in the two groups which were evidently masked when the data for boys and girls were lumped together.

The presence, and even predominance, of certain behavior dimensions at one age provides no evidence as to their presence and importance at early or later ages, just as the prominent tail of the tadpole, so essential to its survival, provides no evidence that a tail was present and significant at an earlier stage or that it will be prominent in the mature frog and of major importance to its existence. The presence of a given behavior pattern at an earlier or later stage of development can only be determined by an analysis of data collected on the subjects at those ages. For this reason, the analyses of data on samples of subjects both older and younger than the Basic Sample, and a comparison of the findings obtained, are of major importance if the results are to have any implications for other than one age level.

Although the factors obtained at the two age levels in this chapter are similar, some differences in behavior patterns are found for the same subjects between the three year level and the four and one-half year level, and both differ to some degree from the total sample. All of the 69 subjects in this group, rated approximately 18 months apart, were also in the Basic Sample. Thus, the subjects of the Consistency Sample make up 50 percent of the total group. The variety of circumstances which led to this particular portion of the Basic Sample remaining in the study are unknown. Consequently, it will not be possible to determine the extent to which selection accounts for the differences in factor patterns between this group of subjects and the Basic Sample and the extent to which differences in developmental level account for them. In view of the replicability of results shown in the Invariance Study, developmental knowledge of earlier research in child development, that the behavior patterns present on the two occasions would give some possible indication of the differentiation, integration, or shift in the personality factors. In the first part of this chapter a broad view of the operation of these processes for the entire sample of the Consistency Study will be presented in terms of the factors obtained at the three and four and one-half year levels, and in terms of the coefficients of factor invariance between the two age levels. In the second part of this chapter, the number of scores for each child is reduced from 61 to the number of factors that account for the intercorrelations among the 61 ratings. Because correlations of 1.00 were used in the diagonal of the correlation matrix, the factor scores obtained from a given set of data are uncorrelated. The relationship between factor scores, based on the same set of loadings, for the subjects at age three and four and one-half years are computed and provide a way of showing the consistency of relative standings on given behavior patterns as the child develops from age three to four and one-half years. This measure is referred to as the coefficient of subject invariance (Pinneau and Newhouse, 1964) and provides an index of the stability of scores for a group of children on the same cluster of behavior on two occasions. As such, it is one of the first longitudinal studies to objectively

Table 38

Coefficients of Factor Invariance*

Based on Early and Late Consistency Loadings**

		Late										
	Factor	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Early	I	.106	.963	.274	.228	.131	.228	-.098	-.069	-.001	-.162	-.158
		.054	.927	.197	.162	.117	.115	.042	-.096	-.049	-.147	.029
	II	.704	.096	-.094	-.065	-.466	.009	.225	-.120	.146	-.052	.330
		.799	-.049	.017	.046	-.312	.144	.126	-.314	.041	-.059	.214
	III	.549	.011	-.213	.226	.238	-.198	-.122	.392	.093	-.045	-.238
		.742	-.130	.001	.164	.188	-.043	-.213	.268	-.088	-.063	-.297
	IV	.087	.004	.061	.471	.330	-.260	-.068	.420	.809	.194	.026
		-.190	-.038	.028	.362	.346	-.106	.038	.255	.733	.145	.085
	V	-.099	-.018	.304	.071	.146	-.285	.834	-.412	.069	.300	-.114
		-.154	.048	.250	.192	.081	-.095	.743	-.304	.188	.309	-.020
	VI	-.001	-.079	-.130	.513	-.129	.447	-.236	.047	-.029	.239	.493
		.115	-.074	-.096	.622	-.179	.427	-.117	-.123	.140	.092	.464

Table 38- Continued

		Late										
	Factor	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Early	VII	-.099	-.090	.474	.460	-.074	.211	-.152	.124	-.364	.502	-.235
		.125	-.258	.563	.396	-.174	.134	-.097	.152	-.349	.343	-.283
	VIII	.044	-.069	.699	-.232	.103	-.140	-.080	.040	.164	-.272	.251
		.109	-.106	.836	-.195	.130	-.056	-.134	.168	.105	-.269	.204
	IX	.299	-.003	.109	-.088	.005	-.078	-.035	-.211	.186	.153	-.457
		.621	-.126	.033	-.014	-.159	-.035	-.200	-.195	.032	.172	-.438
	X	-.050	-.055	.020	-.126	.594	.546	.026	-.078	.038	-.176	-.095
		.143	-.094	.032	-.065	.693	.556	.132	-.040	.147	-.181	-.015
	XI	.227	-.115	.096	-.069	.272	-.310	.137	-.174	-.145	.280	.309
		.330	.049	.132	-.140	.381	-.289	.061	-.393	-.203	.221	.333

*Varimax Rotation

**Upper figures are for Early Consistency Sample, lower figures are for Late Consistency Sample.

Table 39

Variable	Consistency Sample Early Factor I	Late Factor II
50. Numerous interests	.860	.651
38. Friendships, close, intimate	.855	.814
37. Social, not solitary	.822	.799
48. Active	.815	.544
59. Rarely a spectator	.806	.639
9. Enthusiastic	.808	.602
49. Vigorous	.798	.402
43. Cooperates with group	.790	.626
40. Popular	.786	.798
23. Initiates play	.769	.404
44. Leads others	.756	.557
51. Ambitious	.733	.448
21. Competitive	.728	.563
10. Reckless, carefree	.667	.367
47. Expressive voice	.548	.335
7. Smiles, laughs	.534	.229
53. Deliberates	-.508	-.362
42. Responds to social pressure	.332	.535
Sum of squared loadings for all variables	13.191	14.730

Minimum value which variables must load on one or the other factor, .500.

show the degree of stability in behavior patterns for young children.

Table 38 presents the coefficients of factor invariance between the three and four and one-half year old nursery school children, the Early Consistency (EC) and Late Consistency (LC) samples, respectively. The coefficients indicate the relationship between factors for the two age levels; in most cases, relationships are moderate to high. That the same variables are involved in highly related factors will become evident as the individual factors are considered. Relationships with other factors are also evident which, from a psychological point of view, if not expected, are at least plausible. These relationships will also be discussed as we consider each factor.

Where a factor for the children at four and one-half years is at least moderately related to a factor obtained for the same subjects at the earlier age, the factors will be presented in one table with the loadings ranked from high to low for the three year olds. Factor XI at the first age and Factor VIII at the later age will be presented separately with the loadings ranked from high to low because for neither is a corresponding factor evident at the other age.

Sociability

Table 39 presents the variables which contribute the most

Table 40

	Variable	Consistency Sample	
		Early	Late
		Factor II	Factor I
16.	Aroused by thwarting from children	.807	.795
1.	Overt emotion is easily aroused	.805	.680
2.	Overt emotion is turbulent, violent	.801	.821
17.	Aroused by thwarting from adults	.788	.834
4.	Cries	.730	.412
5.	Lacks inhibition	.692	.709
15.	Aroused when thwarted by inanimate objects	.658	.736
13.	Does not pout	-.589	-.347
27.	Negativistic	.570	.778
18.	Displays temper	.451	.892
22.	Maintains own rights	.428	.783
34.	Respectful of other's rights	-.435	-.790
31.	Unselfish	-.424	-.816
6.	Agreeable, good-natured	-.360	-.647
25.	Bosses	.354	.658
53.	Deliberates	-.316	-.578
19.	Aggressively combative	.306	.835
42.	Responds to social pressure	-.289	-.607
30.	Kind	-.288	-.798
20.	Acquisitive	.264	.659
3.	Emotion is persistent	.254	.507
26.	Bullies	.201	.645
49.	Vigorous	.193	.604
48.	Active	.186	.499
32.	Dependable	-.129	-.645
24.	Teases	.019	.521
43.	Cooperates with group	-.083	-.542
	Sum of squared loadings for all variables	7.082	14.730

Minimum value which variable must load on one factor or the other, .500.

weight to what has been called the sociability factor at the two age levels. A comparison of the loadings suggests a change in constellation of the behavior pattern from age three to age four and one-half years.

If one considers the variables which show the greatest change in correlation with the factor from the first to the second age level, it becomes apparent that such variables as *active*, *enthusiastic*, *vigorous*, *initiates play*, *ambitious*, and *reckless* become less important in defining the dimension at four and one-half years. Thus, it appears that the very broad personality trait that we called sociability has some age differences in the medium through which sociability is expressed. Yet, as was seen in Table 38, the coefficients of factor invariance for sociability were .96 and .93 for the two age levels.

Emotional Reactivity

The factor pattern for the three year-olds, presented in Table 40, appears to be one of volatility of temperament or ease with which emotional responses are triggered by objects in the environment. This dimension of behavior is identified as emotional reactivity since it is very similar to a behavior pattern found in studies reported in the earlier chapters. This factor is highly related to the first factor for the Late Consistency Sample, the coefficients

Table 41

Variable	Consistency Samples	
	Early Factor III	Late Factor I
26. Bullies	.785	.645
34. Respectful of other's rights	-.682	-.790
19. Aggressively combative	.677	.835
30. Kind	-.643	-.798
32. Dependable	-.581	-.645
24. Teases	.506	.521
25. Bosses	.455	.658
18. Displays temper	.442	.892
31. Unselfish	-.361	-.816
22. Maintains own rights	.345	.783
5. Lacks inhibition	.330	.709
42. Responds to social pressure	-.266	-.607
16. Aroused by thwarting from children	.255	.795
49. Vigorous	.244	.604
43. Cooperates with group	-.244	-.542
53. Deliberates	-.213	-.578
6. Agreeable, good-natured	-.211	-.647
27. Negativistic	.181	.778
2. Overt emotion is turbulent, violent	.160	.821
20. Acquisitive	.134	.659
17. Aroused by thwarting from adults	.134	.834
15. Aroused when thwarted by inanimate objects	.132	.736
1. Overt emotion is easily aroused	.100	.680
3. Emotion is persistent	.092	.507
Sum of squared loadings for all variables	4.759	14.730

Minimum value which variable must load on one or the other factor, .500

of invariance being .70 and .80. As is seen in Table 40, the behavior pattern for the children at four and one-half years appears to have more of an anti-social caste with large negative loadings on the variables respectful of others' rights, unselfish, and kind. Indeed, this factor includes as high-loading variables all but two of those attributes defining the socialization dimension for the Basic Sample (Table 8), and all of those defining variables loading on a related dimension at three years (Factor III, Table 41). The sum of the 61 squared factor loadings at age four and one-half years is much larger (14.73) than that at age three years (7.08). It is the largest factor for the four and one-half year olds and is second largest for the three year olds. Nevertheless, the relationships between the two factors are .70 and .80 for the children at the two age levels.

Impulse Control and Belligerency

Table 41 presents a factor pattern for the EC sample which includes all the variables of the Basic Sample which loaded on socialization, except responsible and not sensitive. Because a number of other variables also have high loadings on this factor, it appears to be a somewhat different dimension than socialization as established for the Basic Sample. The highest loading attributes, bullies, lack of respect for others' rights, aggressively combative, unkind, undependable, teases, bosses, and displays temper, indicate a pattern of behavior which has special relevance to meeting needs and wants. The child with a high score on this dimension could be expected to seek immediate satisfaction of his impulses by attempting to go directly to his goal, running roughshod over whatever and whoever was in his way. In contrast, the child with a low score on this dimension would appear less "impulse driven." It may be that the impulses of such children are less strong, that they have found alternative and less obvious avenues for meeting their needs, or that they have more ability to control their impulses. This pattern at age three is not related to any other behavior pattern at age four and one-half years, except Factor I.

Without exception, the defining variables of Factor III at three years are also among the defining variables of Factor I at four and one-half years. This is also the case for the emotional reactivity factor for the Basic Sample except for one variable, cries. The fusion at the later age of direct emotional expression and behavioral attempts at immediate gratification suggests the increasing pressure of "socialization" forces on the "impulse ridden" child as he approaches school age, the emotional behavior which results, and, by inference, the difficulty which he has in finding socially acceptable means for gratifying his needs. Of course, the

Table 42

Variable		Consistency Samples Early Factor IV	Consistency Samples Late Factor IX
11.	Free from apprehension	.804	.823
60.	Adjusts to new situations	.774	.563
12.	Not sensitive	.707	.213
41.	Rarely embarrassed	.658	.305
35.	Self-reliant	.517	.347
61.	Free from nervous habits	.460	.392
10.	Reckless, carefree	.398	.284
36.	Friendly	.371	.181
46.	Persuasive	.370	-.088
25.	Bosses	.306	-.064
55.	Perseveres	.302	.327
Sum of squared loadings for all variables		4.406	2.400

Minimum value which variable must load on one or the other factor, .300.

causal influences cannot be ascertained from the present data. It might be that frustrations resulting from emotional behaviors lead to associated aggressive responses. It could also be that aggressive behavior leads to associated emotional reactions in the face of social responses (e.g., restraints).

At three years, the sum of the squared factor loadings for the 61 variables equals 4.76. Factor I for the Late Consistency Sample has a sum of squared loadings of 14.73, a value whose largeness may reflect the force of the confrontation between the child's needs and environmental pressures.

Confidence

The major variables which define the similar factor patterns in Table 42 for the Consistency Samples are the same as those which defined a pattern called confidence in the analysis of data on the Basic Sample. Consequently, this behavior pattern is also so named. The major difference between the two age levels in the Consistency Sample is in the amount of variance which the variables contribute to this factor. While the factor loading of the first variable, extent of apprehensiveness, is essentially the same at the two ages, at the four and one-half year level the other variables contribute markedly less. This, of course, is reflected in a comparison of the sum of the 61 squared

Table 43

Variable	Consistency Sample	
	Early	Late
	Factor V	Factor VII
33. Responsible	.805	.800
52. High standards in work and play	.697	.252
32. Dependable	.658	.463
24. Teases	-.547	-.565
53. Deliberates	.530	.209
28. Vain	.518	.075
54. Concentrates	.394	-.013
30. Kind	.381	.286
34. Respectful of other's rights	.368	.361
42. Responds to social pressure	.362	.226
5. Lacks inhibition	-.326	-.143
4. Cries	-.324	.006
12. Not sensitive	-.273	-.302
29. Bids for attention	-.245	-.339
43. Cooperates with group	.202	.317
Sum of squared loadings for all variables	4.156	2.544

Minimum value which variable must load on one or the other factor, .300.

factor loadings at the two ages, 4.41 at three years versus 2.40 at the later age. The relationships between the factors over age are high, being .81 and .73.

Socialization and Maturity

The fifth factor for the EC sample and the seventh for the LC sample are highly related; coefficients of factor invariance being .83 and .74. The sum of squared factor loadings for 61 variables are respectively 4.16 and 2.54.

A different aspect of socialization appears to characterize the factors of Table 43 than characterized the factors considered in Table 41, namely, assuming mature role responsibility and living up to cultural expectations. This factor at the two ages also has less negative qualities than are evident on socialization for the Basic Sample. In psychoanalytic terms, ego functions appear to dominate this dimension for the Consistency Sample, where superego functions holding id impulses in check seem to appear more evident in the case of the Basic Sample. Children scoring high on the dimension isolated for the Consistency samples would be regarded as socially mature for their age, and conforming; children at the other end of the continuum would be regarded as socially immature with little or no concern for social structure or adult-like goals.

Affection

In the analysis of data on the Basic Sample, as well as

Table 44

Variable	Consistency Sample			
	Early		Late	
	Factor VI	Factor IV	Factor VI	Factor XI
29. Bids for attention	.777	.600	.080	.184
39. Responds to affection	.764	.523	.157	.670
7. Smiles, laughs	.608	.497	.664	.063
8. Pleasant facial expression	.544	.356	.661	.092
28. Vain	.486	.200	-.021	.026
24. Teases	.464	.276	.230	-.104
36. Friendly	.464	.781	.287	.137
18. Displays temper	.431	.137	.036	.129
45. Talkative	.406	.732	.208	-.046
61. Free from nervous habits	-.356	-.305	-.156	-.076
6. Agreeable, good-natured	.324	.117	.408	.020
53. Deliberates	-.316	-.328	-.248	-.138
57. Imaginative	.238	.384	.404	-.058
56. Curious	.192	.540	.095	-.122
10. Reckless, carefree	.190	.430	.267	.093
9. Enthusiastic	.184	.414	.482	.063
27. Negativistic	.162	-.104	.023	.343
1. Overt emotion is easily aroused	.156	.220	.349	.197
47. Expressive voice	.156	.598	.154	.078
60. Adjusts to new situations	.134	.629	.115	-.031
37. Social, not solitary	.102	.333	.169	-.172
46. Persuasive	.100	.597	-.133	.044
13. Does not pout	.085	.062	.401	-.131
41. Rarely embarrassed	.063	.724	-.027	-.014
25. Bosses	-.014	.255	.024	-.379
Sum of squared loadings for all variables	4.005	5.937	2.740	1.654

Minimum value which variables must load on one or the other factor, .300.

in the separate analyses for the boys and the girls, a factor was obtained which reflected response to affection. A similar dimension appeared in the analysis of the Early Consistency data, Factor VI, Table 44. The other high loading variables at three years include *bids for attention*, *smiles* and *laughs*, and *pleasant facial expression*. This dimension is related to several factors at the four and one-half year level. Its relation to Factor XI is indicated by coefficients of invariance of .49 and .46, a dimension whose only loading above .40 is .67, the loading of the scale *responds to affection*.

This affection factor for the three year age group is related to a similar extent to verbal fluency, Factor IV, and affability, Factor VI, at age four and one-half. The coefficients of invariance with Factor IV are .51 and .62. In addition to *responds to affection*, high loading scales on this factor include *bids for attention*, *friendly*, *talkative*, and *rarely embarrassed*, *adjusts to new situations*, *persuasive*, *expressive voice*, and *curious*. This combination of variables in relation to EC Factor IV may suggest the utilization of verbal skills, and ease and openness of manner in obtaining affection and acceptance.

The relation of the EC factor to LC Factor VI, as indicated by coefficients of factor invariance of .45 and .43, is perhaps not as obvious. The resemblance appears to be

Table 45

Variable	Consistency Samples			
	Early Factor VII	Late Factor III	Late Factor IV	Late Factor X
57. Imaginative	.719	.609	.384	.246
58. Original	.629	.770	.214	.063
45. Talkative	.574	.029	.732	.151
47. Expressive voice	.535	.358	.598	.122
56. Curious	.486	.370	.540	-.086
41. Rarely embarrassed	.469	.206	.724	.178
46. Persuasive	.410	.453	.597	-.039
44. Leads others	.281	.611	.211	.058
23. Initiates play	.257	.720	.110	.010
7. Smiles, laughs	.280	.082	.497	.010
36. Friendly	.242	.110	.781	-.036
52. High standards in work and play	.212	.880	.071	.062
9. Enthusiastic	.207	.120	.414	-.124
28. Vain	.179	-.053	.200	.826
51. Ambitious	.178	.672	.167	-.179
35. Self-reliant	.175	.489	.274	-.075
29. Bids for attention	.173	-.059	.600	.122
39. Responds to affection	.153	.049	.523	.076
59. Rarely a spectator	.142	.528	.111	-.094
10. Reckless, carefree	-.019	.119	.430	-.196
55. Perseveres	.019	.641	.100	-.102
60. Adjusts to new situations	-.016	.250	.629	-.017
54. Concentrates	-.006	.825	-.043	-.144
Sum of squared loadings for all variables	3.337	6.342	5.937	1.716

Minimum value which variable must load on one of the factors, .400.

mediated by *smiles*, *pleasant facial expression*, *agreeable*, and *good-natured*, as common variables. It may be that the three LC factors are related to the three year dimension because they share its feature of indicating an open positive relation with others. The relative importance of these factors can be evaluated by considering the sum of squared factor loadings which appear at the bottom of Table 44.

Verbal Creativity and Fluency

The seventh factor for the Early Consistency Sample, Table 45, is highly similar to the fourth factor for the Basic Sample, although the loadings for *imaginative* and *original* are higher than the loading for *talkative*. This EC factor of verbal creativity is related to three factors at four and one-half years -- III (achievement), IV, (verbal fluency), and X (vanity).

The achievement and creativity factor at four and one-half years is characterized by two of the scales which loaded high on the verbal creativity factor at age three -- *imaginative* and *original*. It may be that the similarity indicated by coefficients of factor invariance of .47 and .56 is due in large part to these attributes. Other attributes which characterize the achievement and creativity factor at the later age include *high standards in work and play*, *concentrates*, *initiates play*, *ambitious*, *perseveres*, and leads others.

The verbal fluency factor at age four and one-half includes most of the marker variables characteristic of the verbal creativity factor at three years with the notable exception of imaginative and original. Other variables with high loading at the later age suggest the addition to the dimension of a component of social ease and out-goingness; namely, friendly, adjusts to new situations, and bids for attention. The coefficients of factor invariance are .46 and .40.

Factor X at four and one-half years has really only one marker variable, vain. A similar single scale factor was clearly evident in several of the analyses presented in earlier chapters. The empirical relationship between this factor and verbal creativity at three years is shown by coefficients of factor invariance of .50 and .34; however, the basis of this relationship is not readily evident from inspection of the two sets of loadings. That these two factors are not orthogonal even as partially presented in Table 45 can be easily verified by taking the sum of the cross-products of the loadings; the sum of the cross-products is .520, rather than zero as would be the case if they were unrelated.

The relative importance of these different factors can be inferred from the sum of squared factor loadings

Table 46

Variable	Consistency Early Factor VIII	Sample Late Factor III
54. Concentrates	.761	.825
55. Perseveres	.670	.641
58. Original	.485	.770
52. High standards in work and play	.387	.880
51. Ambitious	.356	.672
59. Rarely a spectator	.320	.528
23. Initiates play	.324	.720
35. Self-reliant	.218	.489
44. Leads others	.176	.611
46. Persuasive	.093	.453
57. Imaginative	.028	.609
Sum of squared loadings for all variables	2.526	6.342

Minimum value which variable must load on one or the other factor, .400

given at the bottom of Table 45.

Achievement

The dimension labeled achievement in both the Basic Sample and in the Consistency Samples at three years (Table 46) was of little importance relative to the other factors which were obtained. At age three the sum of the squared loadings was only 2.53. In describing this dimension for the Basic Sample it was suggested that the little variance for which it accounts might well be a function of the nursery school setting where emphasis is placed on the free choice of activities in a social setting rather than on competition, on the achievement of specific goals, or on the attainment of certain intellectual skills. Still it is in this same environmental setting, at least in a physical sense, that a similar dimension is found in the same children 18 months later which stands third in importance and accounts for much more of the variance.

In some respects, the factor pattern has a different cast at the two ages. At three years, as can be seen in Table 46, the two variables with the highest loadings are concentrates and perseveres, and the remaining variables at age three have much lower loadings. In contrast, at four and one-half years all of the variables have moderate to high loadings. Thus, the factor which at age three appeared of relatively little importance, and simple in definition, appears to pervade many more areas of behavior

Table 47

Variable	Consistency Samples Early Factor IX	Consistency Samples Late Factor XI
20. Acquisitive	.773	-.281
31. Unselfish	-.596	.248
22. Maintains own rights	.402	.030
61. Free from nervous habits	-.390	-.076
42. Responds to social pressure	-.370	.255
30. Kind	-.315	.172
43. Cooperates with group	-.309	.197
27. Negativistic	.196	.343
25. Bosses	.161	-.379
39. Responds to affection	-.049	.670
Sum of squared loadings for all variables	2.441	1.654

Minimum value which variable must load on one or the other factor, .300.

by four and one-half years and stands with the dimensions of sociability and verbal creativity in being of prime importance in accounting for the variance common to the 61 variables.

The coefficients of factor invariance for achievement at the two age levels are .70 and .84, suggesting considerable consistency of the dimension, despite its increasing importance.

Acquisitiveness

The last of the factors that the Consistency Sample seems to have in common at the two age levels is presented in Table 47. A relationship between the two factors is not readily evident, even if one reverses the signs for the loadings on Factor XI. At age three, with high loadings on the variables acquisitive, and selfish, and low loadings on maintains own rights, not free from nervous habits, and unresponsive to social pressure, it appears that the factor could be identified as acquisitiveness, a factor quite similar to that found in the Early Invariance Sample. At age four and one-half years there are only low loadings on the variables acquisitive and selfish, with the largest loading occuring on the variable responds to affection. Yet, with greater similarity than dissimilarity in loadings and with the factors at the two age levels being related, .46

Table 48

Variable	Consistency Samples Early Factor X	 Late Factor V	 Late Factor VI
14. Does not whine	.722	.818	.197
13. Does not pout	.566	.298	.401
6. Agreeable, good-natured	.494	.191	.408
35. Self-reliant	.398	.650	.025
8. Pleasant facial expression	.364	.179	.661
4. Cries	-.214	-.780	.094
55. Perseveres	.168	.478	.095
9. Enthusiastic	.160	.060	.482
7. Smiles, laughs	.155	.140	.664
1. Overt emotion is easily aroused	-.146	-.304	.349
57. Imaginative	.070	-.228	.404
Sum of squared loadings for all variables	2.126	3.628	2.740

Minimum value which variable must load on one or the other factor, .300.

and .44, when the signs are reflected on one of the factors, it appears that there is some consistency in the dimension from age three to four and one-half years.

Affability

The marker variables of the dimension for the Basic Sample called affability, except for smiles, are those which characterize Factor X for the EC sample. At four and one-half years of age, the marker attributes for the affability factor of the Basic Sample load on two different factors, V and VI. Early Consistency Factor X is correlated with Late Consistency Factor V to the extent of .59 and .69; the common marker variables are does not whine, and self-reliant. The coefficients of invariance for the EC Factor V and LC Factor VI are .55 and .56. The common marker variables are does not pout, agreeable, and pleasant facial expression.

Self-sufficiency or assurance as well as affability, appear to characterize Factor V at the four and one-half year level. Self-reliance and perseverance appear to play an important role in defining this factor, and emotional control is more characteristic of the high scoring children on this dimension.

LC Factor VI, in terms of face validity, seems more similar to affability as defined for the Basic Sample,

Table 49

Variable	Consistency Sample Early Factor XI
3. Emotion is persistent	.718
27. Negativistic	.500
36. Friendly	-.312
Sum of squared loadings for all variables	1.868

Minimum value which variable must load on one or the other factor, .300.

Table 50

Variable	Consistency Sample Late Factor VIII
12. Not sensitive	.666
13. Does not pout	.593
3. Emotion is persistent	-.513
21. Competitive	-.402
41. Rarely embarrassed	.368
Sum of squared loadings for all variables	2.501

Minimum value which variable must load on one or the other factor, .300.

although it is not as similar in terms of empirical measurement. One might suspect that this is an important pattern of behavioral adjustment for children who need environmental support, whereas the pattern of behavior shown by Factor V probably adequately meets the needs of those children who find environmental approval less necessary.

The relative importance of these factors may be gauged by considering their sum of squared factor loadings as given in Table 48.

Emotional Persistence (for three year olds)

The factor pattern shown in Table 49 is tentatively characterized as emotional persistence. With substantial loadings only on *emotion is persistent* and *negativistic*, and a low negative loading on unfriendly, no further elaboration appears warranted. This factor showed only inconsequential relationships with the factors at the four and one-half year level.

Insensitivity (four and one-half year olds)

The moderate loadings shown in Table 50 for the four variables not *sensitive*, *does not pout*, *emotion is not persistent*, and not *competitive*, appear to indicate a dimension of insensitivity for children of age four and one-half years. A similar factor was not identified for children of age three, nor was a similar factor identified

Table 51

Coefficients of Subject Invariance - Early Consistency Loadings*

Late   Early and Late Consistency Samples

	Factor	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Early	I	.558	.099	.102	.044	-.105	.094	-.074	-.103	.050	-.033	.118
	II	.118	.663	.215	-.080	.050	.271	.049	.180	.150	.147	.176
	III	.032	.202	.436	-.124	-.283	.034	.056	.137	.091	-.043	-.092
	IV	.006	-.122	-.010	.675	.208	.259	.115	.046	-.052	.063	-.109
	V	-.108	-.034	-.252	.167	.572	-.086	-.228	-.015	-.205	-.039	.332
	VI	-.166	.194	.127	.140	-.035	.485	.092	-.161	.114	.070	-.041
	VII	.009	-.017	.083	-.057	.227	-.086	.518	-.084	.086	-.239	.085
	VIII	.001	.014	-.040	.121	-.027	-.006	.005	.565	-.013	.169	-.044
	IX	-.250	.096	.154	-.126	-.069	.119	.132	.078	.414	-.102	.031
	X	.096	.140	.148	-.281	.049	.067	.061	.073	.127	.219	.117
	XI	-.170	.081	-.034	-.060	.020	-.144	-.047	.105	.085	-.116	.24

* Varimax Rotation

in any of the other analyses. It may be that this pattern of behavior is just becoming evident and would be more apparent in children of an older age. The sum of the 61 squared factor loadings for this dimension is 2.50. It is the eighth largest of the eleven factors. As is shown in Table 38, the insensitivity factor at age four and one-half is related to several of the factors at the three year old level.

Up to now, this chapter has dealt with the invariance of factors for a group of children at two age levels, three and four and one-half years. Eight factors were found to be highly to moderately invariant over this period. These factors could have occurred at both age levels even if there were no individual consistency over the 18 month interval. One way to determine the degree of relative stability in scores for all the children from one age level to the other is to correlate factor scores based on the same set of loadings on the two occasions. This measure is the coefficient of subject invariance, as devised by Pinneau and Newhouse (1964). It can readily be seen in Tables 51 and 52, with the exception of the last two factors obtained for the EC sample, the largest coefficients in the rows or columns are in the principal diagonal. These correlation coefficients are comparable to those found by Honzik,

Table 52

Coefficients of Subject Invariance - Late Consistency Loadings*

Early and Late Consistency Samples

		Early										
	Factor	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Late	I	.635	.184	-.124	-.005	-.116	.119	-.028	-.045	.050	-.046	.079
	II	-.054	.524	.034	.048	.050	.065	.053	-.041	-.105	-.097	-.115
	III	.097	-.060	.447	.009	.025	-.117	.036	-.067	.175	-.162	-.091
	IV	.063	.267	.079	.735	-.001	.212	-.309	.297	.250	.151	.044
	V	-.170	.109	.183	-.013	.305	-.079	.050	.041	.079	-.102	.118
	VI	.030	-.055	-.271	-.112	-.104	.381	-.160	.046	.065	-.260	.118
	VII	-.074	-.136	.112	-.075	-.155	-.153	.572	-.301	-.015	.041	-.119
	VIII	-.010	-.182	-.144	.010	-.135	-.204	-.155	.444	.005	-.041	-.032
	IX	.126	.025	.001	.068	-.015	-.261	.151	.090	.590	.068	.179
	X	-.296	-.162	.029	.120	.006	.078	.186	-.162	-.052	.526	-.003
	XI	.102	-.063	-.010	-.084	.005	-.150	.239	-.034	.110	-.146	.484

*Varimax Rotation

McFarlane and Allen (1948) with intelligence test scores at the pre-school level for the longitudinal Guidance Study.

Summary

The behavioral organization of a sample of 69 children at two different ages (three years, and four and one-half years) has been compared in terms of the factor patterns obtained in separate factor analyses of 61 behavioral ratings obtained 18 months apart. The analyses provide the behavior patterns at the two ages that were highly similar and relatively independent of other patterns -- sociability, confidence, and socialization. Two factors at age three, emotional reactivity and impulse control fuse to form one factor at four and one-half years -- impulse control and belligerency.

Four other factors are present at both ages, but age changes in the behavior patterns are indicated both by changes in the marker variables and by the empirical measures of invariance. These factors include affection and affability. The affection factor at three years is related to the factors of verbal fluency and affability at four and one-half years, as well as to affection. Verbal creativity at three years is related to the four and one-half year factors of verbal fluency, achievement and creativity, and vanity. The loadings on the achievement factor for three year olds are highly related to a similar dimension at four and one-half years, but this four and one-half year factor is related to the three year verbal creativity factor. The three year loadings on affability are related both to factors of self-assurance and affability. Self-assurance as an independent dimension was not evident at three years of age. Acquisitiveness is a dimension evident at three years. In terms of face validity, there is not a corresponding factor at four and one-half years; empirically, it is related to the factor termed affection at the later age. Factor XI at three years, emotional persistence, has little relation to any four and one-half year factor, and insensitivity at the later age shows little relation to factors obtained at three years of age.

A number of the factors changed in relative importance from three to four and one-half years. For example, sociability was first in importance at three years, but second in importance 18 months later. Emotional reactivity and impulse control, second and third in importance at the earlier age, even when combined, accounted for less variance at three than the fused factor at four and one-half years. Socialization, which ranked fifth at three years, ranked seventh a year and a half later. The confidence factor which was fourth largest at age three was ninth largest at age four and one-half. On the other hand, the verbal creativity factor was fourth largest at age four and one-half, while it was seventh largest at age three. Achievement, which was eighth at three years, became third in importance at four and one-half years. Affability was tenth largest for three year olds but sixth largest at four and one-half years.

One factor at age three, emotional persistence, was not readily evident at age four and one-half years. Self-assurance was evident at four and one-half years but not at three years. It will be recalled that a related dimension was evident at three and one-half years in the analyses of the data of the Basic Sample at which time it was eighth in importance. The finding that what may be essentially the same dimension is fifth in importance at age four and one-half years may suggest increasing importance of this aspect of behavior with age.

The factor vanity, which occurred as a similar dimension in most of the analyses of data on the Basic Sample, was not separately evident at three years. At four and one-half years it remains as a fairly unimportant and singular factor. The eighth factor at four and one-half years, insensitivity, has not previously occurred, or else the writers have failed to note its relation to comparable earlier factors. Its relation to several of the three year factors (see Table 38) may suggest the partial fusion of several of these into a new dimension of behavior at later ages.

The coefficients of subject invariance showed moderately high relationships between factor scores at the three and four and one-half year levels for nine out of eleven factors. Such consistent results in personality characteristics are comparable to those found in studies on the constancy of intelligence test scores at the pre-school age levels.

Chapter VI

Behavior and Achievement Patterns in Grades One, Three and Five

The elementary school follow-up consisted of obtaining ratings of behavior and achievement from elementary school teachers of children in the Basic Sample. The achievement variables and behaviors rated were presented earlier (Table 5, p. 17). Follow-up ratings could not be obtained on all of the children who were in the Basic Sample because many had left the Berkeley area, and it was not feasible to make appropriate arrangements for collecting data on them. Of the Basic Sample, a total of 78 were included in the first grade follow-up, 61 in the third grade, and 32 in the fifth grade (Table 2, p. 11).

Behavior ratings and achievement data at each of the three levels were factor analyzed. The results of these analyses are covered in the sections which follow. In the next chapter the factors obtained in the elementary school are related to those found on the same subjects while in nursery school. In addition the elementary school factors are compared across grade levels.

Behavior Patterns in the Elementary Grades

First grade behavior. Four behavior factors emerged from the

Table 53

Variable	First Grade Factor I
9. Self reliant	.823
16. Busy	.809
17. Concentrates	.784
5. Initiates work or play	.783
18. Shows originality	.648
15. Leads others	.469
20. Rarely restless or fidgety	.423
Sum of squared loadings for all variables	4.084

Minimum value which marker variables load on factor, .400.

Table 54

Variable	First Grade Factor II
11. Respectful of others' rights	.862
10. Sympathetic, kind	.794
6. Teases	-.782
2. Agreeable, good natured	.707
8. Bids for attention	-.629
7. Negativistic	-.553
Sum of squared loadings for all variables	3.734

Minimum value which marker variables load on factor, .400.

analysis of first grade elementary school ratings, these four jointly accounting for slightly more than 68 per cent of the total variance in behavior studied. In order of importance the dimensions can be designated independence, socialization, sociability, and expressiveness. They account for 20, 18, 16 and 13 per cent of the variance, respectively.

First grade Factor I, independence, is characterized by the behavior attributes listed in Table 53, variables which loaded .40 or higher on this dimension. These attributes seem to indicate a dimension of maturity and independence of action. This factor did not appear in the analysis of the ratings of the Basic Sample on the 61 scales, but, as subsequent analyses show, appears throughout the elementary school years.

The behaviors depicting Factor II appear in Table 54; these variables loaded .40 or higher on the factor. This factor, socialization, is one that has occurred repeatedly in the analyses of younger children, and it seems to be a dimension of continuing importance. The character of the child as seen in his transaction with other children and with adults is essentially what the factor entails.

The attributes comprising Factor III at the first grade level are presented in Table 55. These key scales loaded .40 or higher on the factor. This factor is virtually identical to the sociability factor at the nursery school level.

Table 55

Variable	First Grade Factor III
19. Rarely a spectator	.794
13. Social, not solitary	.793
12. Friendly	.688
14. Poised, self composed	.662
15. Leads others	.584
4. Competitive	.435
1. Emotions readily expressed	.426
Sum of squared loadings for all variables	3.305

Minimum value which marker variables load on factor, .400.

Table 56

Variable	First Grade Factor IV
1. Emotions readily expressed	.767
3. Enthusiastic	.757
20. Rarely restless or fidgety	-.640
8. Bids for attention	.531
7. Negativistic	.381
12. Friendly	.379
18. Shows originality	.366
Sum of squared loadings for all variables	2.642

Minimum value which marker variables load on factor, .300.

Factor IV is represented by the variables in Table 56, variables that loaded .30 or higher on this dimension. The common element in these scales, which are both "positive" and "negative" in tone, seems to be expressiveness. A child who exhibits something of himself through emotional reaction to blocking or interference, or who resists adult direction, would be a child at one pole of this dimension. The placid, quiet, conventional child, the child who in a word is unexpressive, would be at the other pole of this factor.

These four factors comprise the general dimensions of the first grade behaviors as rated by the elementary school teachers. Two factors -- independence and expressiveness -- did not appear in the earlier nursery school analyses, although the elements of previous patterns are evident in these two first grade factors. The other two factors at the first grade level, socialization and sociability, are patterns of behavior that appeared earlier in the children studied; in each previous analysis, both factors loomed as important dimensions of children's behavior.

Third grade behavior. The analysis of the ratings for those Ss from the Basic Sample who were restudied in the third grade yielded five behavioral factors that met the analytic criterion for inclusion. These factors exhaust slightly over 75 per cent of the total variance of behavior ratings, and account for 20, 18, 16, 15 and 7 per cent of the variance.

Table 57

Variable	Third Grade Factor I
16. Busy	.877
17. Concentrates	.862
5. Initiates work or play	.718
9. Self-reliant	.683
20. Rarely restless or fidgety	.550
18. Shows originality	.476
4. Competitive	.424
Sum of squared loadings for all variables	3.961

Minimum value which marker variables load on factor, .400.

Table 58

Variable	Third Grade Factor II
2. Agreeable, good natured	.801
10. Sympathetic, kind	.821
11. Respectful of others' rights	.784
12. Friendly	.728
13. Social, not solitary	.456
8. Bids for attention	-.451
7. Negativistic	-.441
Sum of squared loadings for all variables	3.498

Minimum value which marker variables load on factor, .400.

respectively.

Third grade Factor I is presented in Table 57 which contains those behaviors that loaded .40 or greater on the factor. This factor, highly similar to Factor I at the first grade level, is a dimension of independence. The behaviors making up this dimension reflect capacity for independent initiative and ability to apply oneself without continual external guides. The overall flavor of this factor is that of being able to carry on through one's own resources rather than relying upon direction, control, and ideas from others.

Factor II at the third grade level, represented by those variables listed in Table 58, each loading .40 or greater, is a fusion of elements from factors earlier labeled socialization and sociability. The behaviors making up this factor deal with both interpersonal contact and the nature of it. One extreme depicts kind, respectful interaction with others, while the other describes hostile and aggressive interpersonal relations.

The behaviors presented in Table 59 depict Factor III at the third grade level. These loaded .40 or higher on the factor. This dimension is similar to the nursery school factor labeled emotional reactivity. The difference in behavior pattern between the earlier factor and the one obtained at this grade level is probably due to the rating scales selected for follow-up; those scales that were inappropriate for elementary school children, because of

Table 59

Variable	Third Grade Factor III
1. Emotions readily expressed	.904
3. Enthusiastic	.808
6. Teases	.711
8. Bids for attention	.532
20. Rarely restless or fidgety	-.541
Sum of squared loadings for all variables	3.217.

Minimum value which marker variables load on factor, .400.

Table 60

Variable	Third Grade Factor IV
14. Poised, self composed	.782
19. Rarely a spectator	.716
18. Shows originality	.661
15. Leads others	.573
13. Social, not solitary	.547
9. Self reliant	.477
5. Initiates work or play	.453
12. Friendly	.333
7. Negativistic	-.279
Sum of squared loadings for all variables	2.932

Minimum value which marker variables load on factor, .250.

changes in behavioral repertoire, were excluded. In any case, the dimension contains, as a core, manifest emotional activity on the part of the child, and in this respect it is similar to the first grade Factor IV, expressiveness.

Factor IV in the behavior of the third grade children is defined by the variables presented in Table 60, which are the variables loading .25 or higher on the factor. The dimension represented is one of maturity-immaturity. The factor contains behaviors reflecting a variety of characteristics that point toward a sophisticated, "socially rounded" child, viz., self composure, activity, creativity, leadership, social interaction, and self-reliance. One extreme of this pattern of behavior gives the feeling of a child who leads others through the display of directive personal qualities, social facility, and meaningful ideas of his own which he contributes to the group activity. The other extreme of the factor indicates a child who is low in confidence, spectates rather than plays actively, and is unable to effectively induce followership in others.

Factor V is presented in Table 61, containing those variables that load .25 or higher. This dimension appears to reflect whether the child is self-assertive, holds his own vis-a-vis others, resists suggestions, gets his ideas accepted, and makes a bid for notice from adults.

As previously noted, these five factors account for

Table 61

Variable	Third Grade Factor V
4. Competitive	.618
7. Negativistic	.559
15. Leads others	.591
8. Bids for attention	.405
13. Social, not solitary	.294
Sum of squared loadings for all variables	1.461

Minimum value which marker variables load on factor, .250.

over 75 per cent of the variation in behavior of the third grade Ss as rated by their teachers. The first four factors -- independence, congeniality, overt emotionality, and maturity -- are highly comparable in importance, each accounting for from 15 to 20 per cent of the total variance. Factor V, interpreted as a self-assertion dimension, accounts for only 7 per cent of the total variance.

Fifth grade behavior. Four factors were obtained from the analysis of the teachers' ratings of the sample followed through the fifth grade. All of these factors have been obtained in analyses of data at earlier ages. Indeed, most appeared in each of those previously presented. The factors contribute 28, 22, 13, and 12 per cent of the total variance, a total of 69 per cent.

The factor at this grade level that accounts for the most variation in the behaviors rated by the teachers is represented in Table 62. The scales listed in this table loaded .35 or higher on the factor. This is the socialization dimension, present earlier in the elementary grades and at the nursery school level. This pattern continues as an important dimension of children's behavior as would be expected in what is typically described as middle childhood. However, this factor at the fifth grade level acquires an additional flavor in that some behaviors previously associated with the maturity pattern merge with it.

Table 62

Variable	Fifth Grade Factor I
6. Teases	-.860
11. Respectful of others' rights	.880
7. Negativistic	-.810
20. Rarely restless or fidgety	.763
10. Sympathetic, kind	.790
8. Bids for attention	-.785
2. Agreeable, good natured	.751
14. Poised, self-composed	.401
17. Concentrates	.422
16. Busy	.362
12. Friendly	.386
9. Self-reliant	.396
Sum of squared loadings for all variables	5.570

Minimum value which marker variables load on factor, .350

Table 63

Variable	Fifth Grade Factor II
8. Initiates work or play	.893
16. Busy	.818
18. Shows originality	.768
17. Concentrates	.748
9. Self-reliant	.778
4. Competitive	.703
14. Poised, self composed	.534
15. Leads others	.390
Sum of squared loadings for all variables	4.418

Minimum value which marker variables load on factor, .350

Factor II in the analysis of fifth grade behavior appears in Table 63, which contains the behaviors that correlated .35 and higher with the factor. This dimension is defined by the same variables that defined a factor of independence in previous analyses, and it is so labeled here. As before, these variables depict at one extreme self-reliance and initiative, with little need for outside direction and guidance. At the other extreme, the factor reflects a dependent, conventional, maleable, socially sensitive child.

Factor III is the sociability factor. The behavior scales loading .30 and above on this dimension appear in Table 64. These are essentially the same scales referring to the social activity of the child that defined the factor previously.

Table 65 contains the variables that define Factor IV, which is a dimension of emotionality and one that has occurred in each of the analyses. The factor at this level, as compared with its counterpart in the nursery school, carries more behaviors directly rooted in social transaction, such as friendly, social not solitary, and agreeable. Nonetheless, the factor as a pattern seems to embody the same flavor as the previous factors by the same name.

The four factors describing the general dimensions of behavior for the fifth grade fall into two fairly distinct groups in terms of importance. Factors I and II -- socialization

Table 64

Variable	Fifth Grade Factor III
19. Rarely a spectator	.837
13. Social, not solitary	.792
15. Leads others	.678
12. Friendly	.551
3. Enthusiastic	.304
Sum of squared loadings for all variables	2.558

Minimum value which marker variables load on factor, .300.

Table 65

Variable	Fifth Grade Factor IV
1. Emotions readily expressed	.833
3. Enthusiastic	.802
12. Friendly	.598
13. Social, not solitary	.416
2. Agreeable, good natured	.336
8. Bids for attention	.324
14. Poised, self-composed	.302
Sum of squared loadings for all variables	2.474

Minimum value which marker variables load on factor, .300.

and independence -- account for 28 and 22 per cent of the variance, respectively; Factor III, sociability, and Factor IV, emotionality, account for 13 and 12 per cent of the variance, respectively. The first two factors alone, then, account for one-half of the variation in individual differences in behavior of the children in the fifth grade as rated by their teachers on these twenty scales.

Comments on the Elementary School Behavior Analyses

The factors that emerge in the analyses of elementary school behavior appear to be strikingly similar from age to age, and similar also to certain of the factors that previously were found in the nursery school analyses.

The major dimensions of behavior at the elementary school levels appear to be independence, emotionality, sociability, and socialization. The degree of independence of action, reliance upon the self for direction, and ability to contribute new ideas form the crux of the dimension of independence. This factor, highly important in the elementary school analyses, did not appear in the nursery school analyses in the clear form of a factor of independence. The factor obtained in the nursery school analyses and labeled self-assertion has some similarity to the elementary school factor labeled independence, but it lacks the element of solitary action found at the elementary school level and contains an element of social or interpersonal visibility: The child high on the factor of independence can be seen as carrying on largely by himself, in a solitary activity. The child characterized as high on the factor of self-assertion would be depicted as ascendant in relations with other children.

The elementary school dimension of emotional reactivity has great similarity to the nursery school factor of the same name. The factor at the nursery school level contains many elements that suggest a lack of control of impulse expression and susceptibility to immediate and prolonged outbursts of emotion. The elementary school dimension includes other more "positive" expressive components, such as enthusiastic and friendly. The change in character of the expressiveness dimension cannot be interpreted as evidence for the older child's increased control or placidity in the face of frustration, however tempting and plausible on other grounds, this interpretation may be. The rating scales used in the present study are not sensitive to changes in the absolute amount of behavior expressed. Furthermore, a number of the emotional traits rated at the 2 1/2 to 4 1/2 year level were not included in the elementary school follow-up.

Sociability as a major dimension of behavior seems to permeate all levels of the data analyzed in this study. The dimension has similar characteristics at each age level except for the third grade group. In the latter analysis those characteristics that refer to social or group activity emerge on a factor that previously appeared separate in the form of a dimension of socialization. As contrasted with children of other ages the sociable third grader in this study is also seen as considerate, trustworthy, and kind in his relations with others. Thus, the dimension for this group of third graders does not just reflect amount of social activity, but amount of social activity plus the sign-quality of it, whether positive and amiable, or negative and disrespectful.

A major factor at all ages, as in the case of sociability, is the degree of socialization attained by the child: Is he kind, dependable? Does he tease? Is he respectful of others' rights? This dimension appears in all of the analyses with the exception of the third grade data in which, as just mentioned, socialization and sociability merge into a single factor.

The third grade results unquestionably deviate from the other grade levels in the nature of the dimensions that emerge from the data. In addition to the merger of socialization and sociability, a maturity factor and a self-assertion factor appear in the analyses. Whether these differences reflect change in factor structure with age, or whether these differences mirror changes in the constellation of the group being studied is not clear at this point.

Elementary School Achievement

Ratings of achievement in the elementary school were

Table 66

First Grade Achievement Factors

Variables	Factors I	Factors II
General motor coordination	.768	.294
Manual dexterity	.880	.133
Language facility	.122	.859
Reading	.206	.815
Drawing	.836	.062
Penmanship	.777	.212
Sum of squared loadings for all variables	2.725	1.554

obtained for the children who were included in the follow-up. The interviewers attempted to obtain ratings on the nine achievement variables listed in Table 5, p. 17. For three of the variables (arithmetic, spelling, and social studies) data were not complete in the first grades. Therefore, these variables were excluded from the first grade but are included in those of third and fifth grade data.

First grade. The six variables on which the first grade analyses are based are general motor coordination, manual dexterity, language facility, reading, drawing, and penmanship. The factor loading matrix for the first grade achievement analysis is presented in Table 66. Two factors met the criterion for inclusion which has been used throughout the studies, viz., an eigenvalue of 1.00 or greater. The variables loading high on the first factor are those that involve motor skills; all four variables in this category load highly. This factor accounts for 45 per cent of the total variance.

Factor II, accounting for somewhat less total variance (26 per cent), is a language skills factor. The two variables that have high loadings -- reading and language facility -- were the two with low loadings on Factor I. Similarly, all four of the motor skills marker variables have low loadings on Factor II. Such overlap as exists between the two

Table 67

Third Grade Achievement Factors

	Factors	
Variables	I	II
General motor coordination	.854	.206
Manual dexterity	.926	.150
Language facility	.213	.655
Reading	.029	.904
Arithmetic	.380	.522
Spelling	.340	.796
Drawing	.855	.255
Penmanship	.903	.233
Social Studies	.156	.801
Sum of squared loadings for all variables	3.464	2.979

factors is positive, though slight.

Third grade. The factor loading matrix for the analysis of the third grade achievement ratings is presented in Table 67. This analysis basically replicates the findings for the first grade; however, it appears to yield even more distinct motor skills and language skills factors. In general, the marker variables have higher loadings on their principal factors and lower loadings on the other factor. While the motor skills factor, as in the preceding analysis, continues to account for more of the total variance, the decrease in disparity between the sum of squared loadings for the two factors indicate the increased relative importance of verbal skills. This change may simply reflect the inclusion of additional variables with high dependence on language.

Fifth grade. Three factors emerged from the achievement data for the fifth grade also, and are presented in Table 68. While the gross features of these factors resemble the factors of motor skills and language skills encountered in the first and third grade analyses, the structure for the fifth grade is more complex. Factor I has high loadings for language facility, reading, arithmetic, spelling, and social studies, but it has small negative loadings for manual dexterity, drawing, and penmanship. Factor II is clearly a motor skills

Table 68

Fifth Grade Achievement Factors

Variables	I	II	III
General motor coordination	.262	.680	.106
Manual dexterity	-.276	.848	.214
Language facility	.823	-.150	-.268
Reading	.832	-.256	-.197
Arithmetic	.845	-.013	.002
Spelling	.848	-.106	.203
Drawing	-.259	.893	-.039
Penmanship	-.111	.200	.929
Social Studies	.720	.266	-.376
Sum of squared loadings for all variables	3.545	2.190	1.216

factor, with small negative loadings on the variables with high verbal content. Factor III appears essentially as a specific factor, penmanship, with small positive relations with the motor skills variables and negative to moderate loadings with the verbal facility variables. Table 68 provides the relative importance of the factors in terms of the sum of the squared loadings.

Chapter VII

Consistency of Behavior and Achievement
Nursery and Elementary Schools

The two major issues confronted in this chapter are: (1) How consistent are the behavior patterns from nursery school to grades one, three, and five? (2) For these time periods, how consistent are individual differences on these patterns? These are the same issues dealt with in more limited time perspective in Chapter V; the focus there was on changes within the period of nursery school attendance.

Other sets of analyses considered in this chapter concern the relationships between nursery school behaviors and elementary school achievements. Examined will be the utility of the earlier behavior patterns for predicting the scores on the achievement and skill factors obtained at grades one, three, and five.

Factor Invariance

Stability of behavior patterns from nursery school through elementary school

The stability of the forms of behavior organization from nursery to elementary school can be seen in crude form by visually comparing the factors obtained on these different occasions. Such subjective comparisons, however, provide only limited information. First, there are several sources of variation which cannot be effectively assessed in such inspection: (1) The variables rated at the elementary school ages are fewer in number than those rated earlier; (2) through attrition, the subject sample changes in composition; and (3) the raters are different. Second, the gross comparison achieved through inspection lacks precision. What is desired is a means of assessing change by using a yardstick that permits statements of degree of comparability at the two ages, preferably in the form of a quantitative statement.

The problems presented by differing numbers of variables at the two ages were handled as follows: The data for the nursery school Basic Sample were reanalyzed only for those 20 variables that were also rated at the elementary grade levels. Thus, the variations ascribable to differences in variables which were rated at the two levels are eliminated. The problem of dealing with different subjects in the different age groups was dealt with by comparing the structure at the two different ages only for those subjects present on the two occasions; for example, the nursery school and third grade factors compared are based on the same 61 children.

The second set of problems mentioned earlier, i.e., those centered on precision and quantification, is dealt

Table 69

Basic Sample

20 Variables

	Variable	Factor I
3.	Enthusiastic	.803
13.	Social, not solitary	.850
16.	Active	.828
19.	Rarely a spectator	.807
4.	Competitive	.797
5.	Initiates play	.754
15.	Leads others	.785
9.	Self-reliant	.601

Sum of squared loadings for all variables, 5.842

Minimum value which marker variables load on factor, .500.

Table 70

Basic Sample
20 Variables
Factor II

Variable		
7.	Negativistic	.834
10.	Kind	-.817
11.	Respectful of others' rights	-.795
1.	Lacks inhibition	.616
6.	Teases	.655
8.	Bids for attention	.599
2.	Agreeable, good natured	-.575

Sum of squared loadings for all variables, 3.938

Minimum value which marker variables load on factor, .400.

with through use of coefficients of factor and subject invariance (Pinneau and Newhouse, 1964).

Factor structure of the Basic Sample for 20 Variables. The behavior ratings on the 20 variables used in the elementary school followup were analyzed for the 138 subjects constituting the Basic Sample at the nursery school level. The same procedures and techniques as those used for the analyses of the 61 variables were used here. Four factors were obtained, accounting for 29, 20, 14, and 10 per cent of the total variance. All four are factors encountered in earlier analyses.

The most important factor in terms of variance accounted for is shown in Table 69, which contains the variables loading above .50 on Factor I. This is clearly the sociability dimension obtained in virtually all previous analyses. Little else need be said.

Factor II (see Table 70) is another repeater, the socialization factor. Evidence presented later indicates that from the nursery through the elementary school years, this is the most invariant of the factors.

The factor shown in Table 71 was the third most important in this analysis. The variables loading high on this factor are those that loaded high on the verbal creativity or talkativeness dimension which was obtained in the analysis of data on all 61 variables.

Table 71

Basic Sample
20 Variables
Factor III

	Variable	
12.	Friendly	.753
14.	Rarely embarrassed	.650
18.	Original	.573
8.	Bids for attention	.561
3.	Enthusiastic	.430
2.	Agreeable, good natured	.406
1.	Lacks inhibition	.400
6.	Teases	.397

Sum of squared loadings for all variables, 2,716

Minimum value which marker variables load on factor, .350.

Table 72

Basic Sample

20 Variables

Factor IV

	Variable	
17.	Concentrates	.786
20.	Free from nervous habits	.654
9.	Self reliant	.476
18.	Original	.440

Sum of squared loadings for all variables, 2.060

Minimum value which marker variables load on factor, .400.

The factor is still characterized by expressiveness and openness.

Factor IV, Table 72, appears to be the dimension of independence or self-direction that has been obtained in previous analyses. It was the sixth most important factor in the analysis of the Basic Sample for the 61 variables.

These factors, then, are not surprising in that they represent four of the major dimensions that have appeared in earlier analyses for the nursery school group. Of the dimensions that were prominent in the earlier analyses but do not appear here, the variables that defined them were, for the most part, not represented among the group of 20 variables in the follow-up. They were excluded because most were judged to be inappropriate (or at least less appropriate) for the elementary school ages. For example, the essential variables of the emotionality factor as initially defined, are more clearly characteristic of nursery school behavior than the behavior of older children. Consequently, these variables were not included in the follow-up.

In order to obtain factors for the elementary school subsample at the time they were of nursery school age, additional factor analyses had to be conducted for the appropriate sub-groups of the Basic Sample. Since these factors are not individually discussed in the text, the

Table 73

Factor Invariance: Nursery school to first grade.*

	First grade			
Nursery school	I	II	III	IV
I	.636	-.122	.806	.377
	.418	.393	.670	.216
II	.287	-.926	.096	.585
	-.099	-.916	-.172	.260
III	.314	-.199	.435	.407
	.094	.029	.545	.484
IV	.565	.061	.114	-.197
	.843	.190	-.051	-.304

*Upper value in each pair is based on scores on 78 nursery school children, the lower value on ratings for the same children when they were in first grade.

tables presenting the factors for these subsamples are presented in the appendix.

Comparison of nursery school and elementary grade behavior factors. The factor structure obtained in a given analysis is partially dependent on the subjects present, a fact which may account in part for the apparent differences in behavior patterns obtained at different ages and reported in Chapter VI. As stated above, in the present chapter, this source of variation is controlled by reanalyzing data for the appropriate sub-groups of the Basic Sample in nursery school. The comparisons among the factors at two age levels in this section were made using coefficients of factor invariance (Pinneau and Newhouse, 1964). These were computed using first the earlier standard score matrix then using the standard score matrix for these same subjects at the elementary grade level.

Nursery school to first grade. The analyses reported in this section are based on the 78 subjects on whom records were available at both levels. The factors obtained from the analysis of nursery school data for these 78 subjects are presented in Tables A-1 through A-4 of the appendix. An inspection of Table 73 shows that nursery school Factor I -- sociability -- is positively correlated with all four of the first grade factors. The highest relationship (.806, .670) is with the third factor, identified as sociability at the first grade level, thus indicating substantial invariance of this factor from nursery school to the first grade (cf. Tables 55 and A-1). Sociability at the nursery school level also shows a substantial correlation (.636, .418) with Factor I at the first grade level, independence; it will be noted that several of those characteristics identifying sociability at the nursery school level load highly on the factor called independence in the first grade data, Table 53. The relationship between sociability at nursery school and the other two factors at the first grade level, although low, suggest some common content, or perhaps the operation of a halo effect in the teachers' ratings.

The socialization factor at the nursery school level, Factor II, is very highly related with first grade Factor II, also a socialization factor (cf. Tables 54 and A-2). The high coefficient indicates that the variables defining this dimension are remarkably constant over this time period. The negative sign on the pair of coefficients indicates that the opposite ends of the factor were scored as high at the two ages. The other correlations involving nursery school socialization are not remarkable, although the correlation with first grade Factor IV, expressiveness, may suggest some overlap.

The variables constituting nursery school Factor III, referred to as expressiveness and openness (cf. Table A-3), are to a considerable degree those that define a similarly named dimension at the first grade level, Factor IV, Table 56. This preschool dimension is similarly related to the sociability factor in grade one, Factor III, Table 55.

Nursery school Factor IV, independence and self-direction, is substantially correlated with Factor I at the first grade ages, a dimension also identified as independence, (cf. Tables 53 and A-4). While this factor is much more important in the first grade, accounting as it does for considerably more common variance, the dimension appears to be quite similar at both levels.

The relationships presented indicate considerable invariance in the factors from nursery school to the first grade; in general, high coefficients were obtained between factors with the same names at the two levels. One can also see, if the definitions of the nursery school factors are used as a baseline for comparison with those obtained in the first grade, that each nursery school factor, except perhaps independence, is related somewhat to a second factor in addition to the one to which it is most manifestly similar. This, of course, is also true with respect to using the first grade factors as a baseline for comparison with the nursery school factors, with the possible exception of socialization; however, the relationships are not complimentary at the two ages. For example, the expressiveness factor in the nursery school is correlated with the factor with the same name at grade one and also with Factor III, sociability. But the second factor at the nursery school level which correlates with expressiveness in the first grade is not sociability, but rather socialization. The other factors, except socialization, show the same pattern: first grade socialization is correlated only with socialization in the nursery school. These relationships might be more easily seen if the columns in Table 73 were rearranged so that the factors are in the same name order at the two age levels. The diagonal entries would then be large and the off-diagonals would show different patterns in the upper and lower triangles.

Nursery school to third grade. The factors obtained at the third grade level are more complicated as a set and less characteristic of factors obtained in the other analyses. Consequently, one can expect that the comparisons of factor structure over different ages that involve the third grade sample may show less stability and more complexity than other comparisons. The coefficients of factor invariance for the nursery school to third grade comparisons are shown in Table 74; the factors obtained from the analysis of nursery school data for these 61 subjects are presented in Tables A-5 through A-9 of the appendix.

Table 74

Factor Invariance: Nursery school to third grade.*

		Third grade				
		I	II	III	IV	V
Nursery school	I	.610	.240	.597	.681	.384
		.452	.477	.357	.567	.115
	II	-.043	.827	-.677	-.236	-.159
		.487	.672	-.516	.048	-.116
	III	-.020	.105	-.115	.593	.018
		.161	.263	-.229	.604	-.100
	IV	.640	-.287	.086	.110	.260
		.842	-.106	-.200	.079	.149
	V	.117	.137	.281	-.052	.513
		.042	.110	.448	-.038	.494

*The upper value in each pair is based on scores on 61 nursery school children, the lower value on ratings on the same children when they were in third grade.

The reader will recall that five factors were obtained at the third grade level rather than four, as were found in the other analyses of data on these 20 variables. As reference to Table 74 indicates (see also Tables A-5 to A-9) five factors were also obtained when the data on these 20 variables were analyzed for the 61 nursery school children for whom records were also available in the third grade. Consequently it appears that the difference in number of factors for the two age levels noted in the preceding chapter, reflects change in the composition of the sample rather than a developmental change.

Factor I at the nursery school level, sociability, shows a slight to moderate correlation with all five factors for the same children when they were third graders, an exaggeration of the result also noted in the nursery school to first grade comparison. This suggests that components of sociability at the earlier age contribute to the behavior pattern of independence, positive social interaction, emotional expressiveness, maturity, and self-assertion at the later age, or the operation of a halo effect in the ratings of the elementary school teachers. Surprisingly, the highest relationship is not between Factor I, (Table A-5), and third grade Factor II, which because it has many of the same attributes was labeled sociability-socialization, but with third grade Factor IV, a dimension termed maturity (cf. Tables 58 and 60).

Factor II, the socialization factor at the nursery school level, shows its highest coefficients with the third grade dimension called sociability-socialization, Factor II, (cf. Tables 58 and A-6). It also shows substantial relationships with third grade Factor III, the emotion expressiveness factor (Table 59). The other three pairs of coefficients involved are considerably lower.

The expressiveness-openness factor at the time of nursery school, Factor III, is unrelated to all factors at the time of third grade except maturity, Factor IV (cf. Tables 60 and A-7).

Nursery school Factor IV, labeled independence-self direction, shows a high correlation with the factor similarly identified at the third grade level, Factor I (cf. Tables 57 and A-8). This preschool dimension is essentially unrelated to the other four third grade factors.

As was previously noted, a fifth factor at the nursery school level was not obtained in the analysis of the data on the 20 variables for the total Basic Sample; however, a fifth factor was obtained in the analysis of these data for this subsample of 61 subjects (see Table A-9). This dimension is almost completely determined by the attribute of competitiveness. Table 74 shows that it is most similar to third

Table 75

Factor Invariance: Nursery school to fifth grade.*

		Fifth grade			
	Factor	I	II	III	IV
Nursery school	I	.202	.384	.646	.465
		-.078	.625	.778	.543
	II	-.927	-.116	-.159	.228
		-.889	.442	-.322	.634
	III	.414	.735	.162	-.026
		-.186	.584	.318	.295
	IV	.784	.483	-.094	-.018
		.328	.093	-.140	.080

*The upper value in each pair is based on scores on 32 nursery school children, the lower value on ratings on the same children when they were in fifth grade.

grade Factor V (Table 61), the self-assertion dimension.

If one takes the third grade factors and looks from the perspective of their factor structure to the nursery school dimensions, the picture remains one of a complex factorial relationship. Except for sociability-socialization, Factor II, and perhaps self-assertion, Factor V, each third grade factor has two or more moderate or high pairs of coefficients.

Nursery school to fifth grade. The coefficients of invariance for the nursery school-fifth grade comparisons are given in Table 75. They are based on the 32 children for whom records were available at both ages. Sociability, Factor I in nursery school (Table A-10) is most predictive of Factor III, sociability, in the fifth grade, Table 64; however, it is also positively related to the other three factors, and the correlations with fifth grade independence (Factor II) and expressiveness (Factor IV) are moderately high. Thus, the results are consistent with those found in the comparison of nursery school with first and third grade factors, but the degree of relationship of nursery school sociability with all factors at the fifth grade is perhaps not as high as in the nursery school-third grade comparison.

Factor II at the nursery school level, socialization, is very highly related to socialization at the fifth grade level, Factor I, (cf. Tables 62 and A-11). The relationship is negative because opposite ends of the dimension were scored as high at the two ages. This nursery school dimension is slightly related to expressiveness at the fifth grade but is little related to the other two fifth grade factors.

The fourth factor in the analysis of data on the 20 variables for all 138 subjects (see Table 72) became the third factor in importance when the data for the subsample of 32 nursery school children were separately analyzed (Table A-12). This factor, independence, is substantially related to the second fifth grade factor, independence (Table 63), and unrelated or only slightly related to other factors at the fifth grade level.

Nursery school Factor IV, Table A-13, appears to have attributes of independence and socialization. The only substantial coefficients for this nursery school factor are with the socialization factor at the later age, Factor I, Table 62.

From the perspective of the fifth grade, socialization is highly related to nursery school socialization, but also to a nursery school factor somewhat unique to this subsample, Factor IV. Independence in the fifth grade is related to sociability but primarily to the factor of the same name in nursery school. Fifth grade sociability seems only to be related to sociability at the nursery school level.

The data from these analyses show a considerable degree of similarity between the behavioral organization from the nursery school level to the first, third, and fifth grade levels. However, sociability in nursery school is associated with several factors in each of the different grades studied. Nursery school socialization appears quite stable, being highly related to factors similarly identified in grades one and five, and to the socialization-sociability factor at grade three. Nursery school independence is highly correlated with independence in all three grades. The nursery school factor expressiveness varies in its relationships with factors in the grade school analyses and a separate expressiveness factor was not identified in the subsample of nursery school children on whom data were available in the fifth grade.

Between grade comparisons. This section presents comparisons of factors obtained at different grade levels within the elementary school. The strategy in the analyses completed for these comparisons is identical to that of the last section in which nursery school and elementary school factors were compared: the subjects included in the comparisons are the same at the two levels of any given comparison. This procedure necessitated reanalyses of the first, third, and fifth grade data using samples appropriate to the

Table 76

Behavior Ratings

Coefficients of Factor Invariance*

Based on First and Third Grade Loadings**

		Third grade				
	Factor	I	II	III	IV	V
First grade	I	.898	-.358	-.070	.349	-.064
		.871	.068	-.112	.467	.014
	II	.102	.873	-.280	-.387	-.106
		.338	.882	-.273	-.008	-.140
	III	-.390	.248	.132	.814	.296
		-.124	.427	.078	.869	.059
	IV	.092	.134	.880	-.044	.206
		.171	.123	.889	-.060	.241
	V	.066	.126	-.012	-.144	.776
		.135	.048	.169	-.250	.864

*Varimax Rotation

**Upper figures are for the First Grade Sample, lower figures for the same 56 subjects when in the third grade.

comparison of interest.

First and third grade comparisons. The coefficients of factor invariance are presented in Table 76 for the first-to-third grade comparison. These coefficients are based on the 56 subjects who were available at both the first and the third grades. The factors obtained from data on these subjects at the earlier grade levels are presented in Table A-14 through A-18 of the appendix. These tables also contain the loadings for comparable factors independently isolated in the analyses of their third grade records. The data on this group at the earlier level, grade one, yielded one more factor than was obtained for the total sample of first graders. This dimension, a factor of competitiveness, is the only substantial difference noted. The other four factors are those previously obtained with the total first grade sample.

Table 76 indicates substantial relationships between the factors at the first and third grade levels that contain similar variables.

First grade Factor I, called independence, is highly related to third grade Factor I, called by the same term (cf. Table A-14). In addition, independence at the first grade level is moderately predictive of the sociability factor at the third grade level, Factor IV.

Socialization at the first grade level is highly related to the factor of the same label at the third grade, both Factor II (cf. Table A-15): Save for the slight negative relationship with expressiveness, Factor III, it is unrelated to any of the other factors.

Sociability at the first grade level, Factor III, is highly correlated with the factor of the same name at the third grade level, Factor IV (Table A-16); this first grade factor also is somewhat related to third grade socialization, Factor II.

The factor called expressiveness at the first grade level, Factor IV, is highly related to the factor of the same name in the third grade analyses (Factor III, Table A-17); this first grade factor is unrelated to the other third grade factors.

First grade Factor V, which appears to be an assertiveness-competitiveness dimension, is highly related only to the fifth factor in the third grade analyses, a factor similarly labeled (cf. Table A-18).

Factorial invariance from the first to the third grade is remarkably high, the similarity being characterized by a single high pair of coefficients of invariance for each factor.

First and fifth grade comparisons. The coefficients of factor invariance for the first and fifth grade comparisons are shown in Table 77; the factors on which these were based

Table 77

Behavior Ratings

Coefficients of Factor Invariance*

Based on First and Fifth Grade Loadings**

		Fifth grade			
	Factor	I	II	III	IV
First grade	I	-.901	.203	.141	-.024
		-.959	-.132	.108	.081
	II	-.136	.574	.635	.260
		.091	.646	.460	-.051
	III	.160	.102	.438	.802
		.110	-.208	.554	.750
	IV	.081	.609	.197	-.062
		.362	.745	.145	-.228
	V	-.287	.075	-.388	.134
		-.716	.088	-.460	.019
	VI	-.153	.479	-.318	.454
		-.028	.620	-.486	.310

*Varimax Rotation

**Upper figures are for the First Grade Sample, lower figures for the same 28 subjects when in the first grade.

are depicted in Tables A-19 through A-24. The data on which these findings were based consist of the 28 subjects on whom records were available at both grade levels. In addition to the four factors obtained in the analysis of the data on the total first grade sample, (socialization, sociability, expressiveness, and independence), two other factors were obtained in the analysis of data on this first grade subsample -- resistance and creativity.

Table 77 shows a very high degree of similarity between the first factor in the two analyses; in both cases this is the dimension, socialization (cf. Table A-19).

First grade Factor II, sociability, is about equally related to fifth grade sociability and independence, Factors III and II respectively (cf. Table A-20).

The third first grade factor, expressiveness-openness, is primarily related to the fifth grade factor of the same name, Factor IV, but also moderately related to Factor III, sociability (cf. Table A-21).

Factor IV at the first grade level, independence, is singly related to the second factor at the fifth grade level, a dimension also named independence.

As was pointed out above two factors were obtained in the analyses of data on this subsample that were not obtained in the analyses of data on the total first grade sample. The first of these, Factor V, resistance, is related to the socialization and sociability fifth grade factors (cf. Table A-23); these moderate relationships are both negative. The sixth first grade factor, creativity, is most similar to fifth grade Factor II, independence, and to some extent related to Factor IV, expressiveness, and negatively to Factor III, sociability (cf. Table A-24).

These relationships indicate the presence at both ages of several common factors; however, the differing number of factors at the two ages make the interpretation more complex. There may be question as to whether the last two first grade factors should have been included since only four factors were obtained in the analysis of data on the total first grade sample, and since, at least name-wise, these four factors are the same as those that were obtained in the fifth grade analyses.

Third and fifth grade comparisons. The coefficients of factor invariance for the third-to-fifth grade comparisons are shown in Table 78. The factors obtained from analyses of data on the same set of subjects at these two grade levels are presented in Tables A-25 through A-30 of the appendix. The factors obtained at the earlier level for this subgroup are somewhat different from those obtained from the analyses of the total third grade sample. These

Table 78

Behavior Ratings

Coefficients of Factor Invariance*

Based on Third and Fifth Grade Loadings**

		Fifth grade			
	Factor	I	II	III	IV
Third grade	I	-.244	.291	.243	.827
		-.299	-.074	.192	.828
	II	.867	-.078	.114	.171
		.940	-.034	.214	.207
	III	.174	.606	.226	-.269
		.210	.847	.144	-.330
	IV	.065	.642	-.270	.391
		.400	.796	-.266	.069
	V	-.118	.084	.762	.029
		-.039	.062	.865	-.053
	VI	-.357	.310	.363	.091
		-.386	.403	.601	.120

*Varimax Rotation

**Upper figures are for the Third Grade Sample, lower figures are for the same 28 subjects when in the fifth grade.

apparent differences can be seen by comparing the factors in Tables A-25 through A-30 with the factors given in Tables 57-61. It will be recalled that the analyses of data on the total third grade sample have consistently yielded the most complex factor structures.

Factors I through V at the third grade level are each highly related to one factor at the fifth grade level (Table 78), and not at all or only slightly related to any of the other fifth grade factors. Factor VI at the third grade, however, is moderately related to three of the four factors obtained from the fifth grade data.

Factor I in the third grade appears to be an expressiveness factor and is highly related to the fifth grade factor similarly labeled,Factor IV, (cf. Table A-25). Factor II in the third grade analysis, called socialization, is highly correlated with the factor of similar name at the fifth grade level, Factor I; (cf. Table A-26).

Both Factors III and IV at the third grade are highly correlated with Factor II (labeled independence) at the fifth grade level. Factor III in the third grade appears to be the independence factor minus the features of self-reliance and general poise; in essence, it appears as a dimension of industriousness (Cf. Table A-27). Factor IV at the third grade level seems to embody the independence factor minus the characteristics of industriousness; hence, a factor of poise and self-reliance, (cf. Table A-28). This interpretation is supported by the slight relationships these factors show to two other factors at the fifth grade level: Factor III, industriousness, is negatively related to fifth grade Factor IV, called expressiveness. The picture created here is that of the busy child with a serious demeanor. Factor IV at the first grade level -- self-reliance, poise -- is slightly and negatively correlated with sociability, Factor III, at the time of the fifth grade, a result which suggests that the poised, self-reliant child is seen as somewhat socially aloof.

Factor V at the third grade level is highly related to only the third fifth grade factor, sociability, (cf. Table A-29). Third grade Factor V in these analyses is somewhat difficult to label in terms of the previously encountered factors: tentatively it is designated as a factor of high social participation vs. withdrawal from social contact.

Factor VI at the third grade level, Table A-30, which appears to be an assertiveness factor, does not have a good match in the fifth grade analyses. It shows moderate positive relationships with independence (Factor II) and sociability (Factor III), and a moderate, negative relationship with socialization (Factor I) at the time of the fifth grade. An assertiveness factor as such was not isolated in the analysis of the fifth grade data.

Table 79

Same Subjects in First and Third Grades

(N=56)

Variable	First Grade Factor	Third Grade Factor	
	I	I'	II'
General motor coordination	.803	.866	.207
Manual dexterity	.793	.941	.102
Language facility	.628	.238	.808
Reading	.702	.081	.874
Drawing	.728	.885	.183
Penmanship	.785	.912	.171
Sum of squared loadings	3.306	3.312	1.533

Stability of achievement patterns in elementary school

The factors of achievement for grades one, three, and five were presented earlier in Tables 66-68. In this section the achievement factors isolated at the different grade levels are compared. The procedures used are the same as those employed with the behavioral factors in the previous section. These comparisons required reanalysis of the data on achievement for those subjects on whom records were available in the first and third grades, the first and fifth grades, and the third and fifth grades.

First to third grade comparisons. Achievement factors were independently obtained for those 56 subjects on whom data were available in both the first and fifth grades; these are presented in Table 79. The first grade data yielded a single general factor with high loadings for all variables. At the third grade level two factors, similar to those found in the analyses on the total third grade sample appeared (cf. Table 67). The first of these is a motor skills factor and the other a factor of verbal skills.

The coefficients of factor invariance between the factor at grade one and those at grade three are shown in Table 80. These coefficients indicate that the earlier factor is substantially related to both factors in the third grade. The somewhat higher relationship between the

Table 80

Achievement Variables

Coefficients of Factor Invariance*

Based on First and Third Grade Loadings**

		Third grade	
	Factor	I	II
First grade	I	.883 .878	.671 .478

*The first grade factor is the first principal component; the third grade factors are rotated to varimax criterion.

**Upper figures are for the First Grade Sample, lower figures for the same 56 subjects when in the third grade.

Table 81

Same Subjects in First and Fifth Grades

(N=28)

Variable	First Grade Factor	Fifth Grade Factor	
	I	I'	II'
General motor coordination	.840	.201	.841
Manual dexterity	.823	-.513	.744
Language facility	.582	.907	-.051
Reading	.694	.894	-.118
Drawing	.754	-.319	.894
Penmanship	.670	-.520	.093
Sum of squared loadings	3.222	2.298	2.086

first grade factor and the motor skills factor at grade three is expected in view of the greater representation of the motoric variables in the set of variables studied.

First to fifth grade comparisons. The 28 subjects with achievement data in both the first and the fifth grades provided the basis for the analyses yielding the factors in Table 81. As in the preceding analysis, a single general factor was obtained from the first grade data. Two factors emerged from the achievement data for the fifth grade. While the gross features of these factors resemble the factors of motor skills and language skills encountered in the third grade analyses, the structure for the fifth grade is more complex. Factor I has high loadings for language facility and reading, but it has moderate negative loadings for manual dexterity, penmanship, and drawing. It thus takes on a bipolar caste, with language skills at one end and small muscle skills at the other. Also for the first time in the achievement analyses, general motor coordination and the other motor skills variables are loading in different directions on Factor I. Because of these features, this factor is difficult to label; however, it is referred to as a verbal skills factor because of the relative differences between it and the second factor. Factor II is clearly a motor skills factor. Difficulty of interpretation here is

Table 82

Achievement Variables

Coefficients of Factor Invariance*

Based on First and Fifth Grade Loadings**

	Factor	I	II
First grade	I	.603 .142	.958 .909

*The first grade factor is the first principal component; the fifth grade factors are rotated to varimax criterion.

**Upper figures are for the First Grade Sample, lower figures for the same 28 subjects when in the fifth grade.

Table 83

Same Subjects in Third and Fifth Grades

(N=28)

Variable	Third Grade Factor			Fifth Grade Factor	
	I	II	III	I'	II'
General motor coordination	.774	.213	-.089	.298	.611
Manual dexterity	.868	.026	-.195	-.241	.877
Language facility	.033	.102	.869	.836	-.311
Reading	-.168	.842	.339	.812	-.389
Arithmetic	.330	.714	-.106	.833	-.118
Spelling	.173	.848	.316	.810	-.084
Drawing	.834	-.057	.201	-.271	.818
Penmanship	.894	.176	-.059	-.168	.580
Social Studies	-.131	.235	.808	.812	.102
Sum of squared loadings	3.031	2.084	1.724	3.616	2.428

not that the language variables load on the factor, but rather that some of the marker variables for Factor II also load moderately on Factor I. These two factors are roughly equal in per cent of total variance for which they account.

The coefficients of factor invariance for these factors are presented in Table 82. Again, the higher relationships are between the first grade factor and the motor skills factor (Factor II) at the fifth grade level. The relationship between the first grade factor and fifth grade Factor I (verbal skills) is considered moderate despite the evident disparity between the pair of coefficients of invariance.

Third to fifth grade comparisons. When the third grade achievement data for the 28 subjects present in both the third and fifth grades in the study were analyzed, three achievement factors were obtained (see Table 83). (In contrast only two factors were obtained in the analysis of data on the total third grade sample, Table 67.) The first of the factors in the current analyses appears to be a motor skills factor, the second a "drills skills" factor (with main loadings of reading, arithmetic, and spelling), and the third probably a dimension of facility in verbal expression. At the fifth grade level the latter two factors coalesced. (It will be recalled that three factors were obtained in the analysis of data on the total fifth grade sample, Table 68; however, these three factors

Table 84

Achievement Ratings

Coefficients of Factor Invariance*

Based on Third and Fifth Grade Loadings**

		Fifth grade	
	Factor	I	II
Third grade	I	.155	.474
		-.174	.400
	II	.117	.158
		.260	-.122
	III	.244	.214
		.169	.144

*Varimax Rotation

**Upper figures are for the Third Grade Sample, lower figures for the same 28 subjects when in the fifth grade.

differ somewhat from the three obtained in the current third grade analysis.)

The coefficients of factor invariance for the subjects on whom data were available in both the third and fifth grade are shown in Table 84; they are generally low. The only moderate-sized relationship is that between Factor I in the third grade analysis (motor skills) and Factor II in the fifth grade data (also motor skills); otherwise there seems to be little in common between the structures at the two ages. Thus again the findings on the third grade sample appear to give results which are divergent from those found for other samples in these studies.

Subject Invariance

The preceding sections have compared the similarity of behavior and achievement patterns from nursery school through the elementary grades. Attention is now directed to the consistency during these years of individual differences on these behavior and achievement patterns; i.e., concern is focused on the extent to which children maintain their same relative standing with increasing age on each of the factors isolated in the earlier analyses.

Just as in Chapter V, when the consistency of behavior between three years and four and one-half years was investigated, the age comparisons here require correlating subjects' factor scores at two age levels, both being based either on the factor structure obtained at the earlier age or on that obtained at the later age. Both sets of relationships will be presented. For a given age comparison, the relationships between scores based on the earlier set of factor loadings will be given before presenting those based on the set of factor loadings obtained at the later age level.

The consistency of behavior patterns from nursery school through the elementary grades.

Using the same set of factor loadings in deriving scores for the same set of subjects at two different age levels is equivalent to scoring two sets of test records with the same scoring key. The relationships between scores thus obtained, coefficients of subject invariance (Pinneau and Newhouse, 1964), are not diluted by giving different weights to the same variables or items at different ages; this logic, of course, assumes that the variables or test items have remained constant.

The consistency of relative standing on the behavior factors from nursery school to first, to third, and to fifth grade will be presented in the first part of this section. The second part will concern the consistency of behavior from the earlier to the later grades of

Table 85

Coefficients of Subject Invariance: Nursery School Loadings*

Nursery School and Third Grade Samples

		First grade			
	Factor	I	II	III	IV
Nursery school	I	.173	-.018	.072	-.231
	II	-.004	.518	-.073	-.184
	III	-.021	.121	.411	-.063
	IV	.180	.018	.048	.104

*Varimax Rotation

elementary school.

Subject invariance from nursery school to the elementary grades.

Consistency from nursery school to first grade. The coefficients of subject invariance for the approximate age span three and one-half years to six and one-half years, i.e., from nursery school to first grade, are given in Table 85. This set of relationships is based on the factor loadings obtained from the nursery school data on this sample of 78 subjects. Consistency of relative standing during this three year period is indicated by large diagonal entries; predictiveness across factors over the age period studied is shown by the off-diagonal values.

Two sets of factor scores at the nursery school level predict corresponding factor scores at the first grade level moderately well: Factor II, socialization, shows a coefficient of .518; while Factor III, expressiveness-openness, yields a coefficient of .411. The other two factors -- sociability, Factor I, and independence, Factor IV, -- show little or no consistency from nursery school to the first grade. The off-diagonal entries in the table indicate that for none of the factors is relative standing at the nursery school level helpful in predicting relative standing in the

Table 86

Behavior Ratings

Coefficients of Subject Invariance: First Grade Loadings*

Nursery School and First Grade Samples

		First grade			
	Factor	I	II	III	IV
Nursery school	I	-.040	-.244	.412	.149
	II	.100	.571	-.155	.004
	III	-.126	-.141	.287	.043
	IV	-.348	-.304	.272	.140

*Based on loadings for the 78 first graders who were also rated in nursery school.

first grade on any of the other factors.

Using the same subjects' scores on the twenty variables at the two ages, but weighting them by the first grade factor structure, gives the subject invariance coefficients presented in Table 86. Factor II, socialization, yielded a moderately high coefficient of subject invariance, .571. Factor III, sociability, shows a slight-to-moderate relationship of .287. Scores on the other two factors, independence and expressiveness, show negligible consistency.

In this matrix there are some moderately large off-diagonal values, suggesting some predictive relationships across factors from the nursery school to the first grade. High scores at the nursery school level on Factor I, independence, are associated with high scores in the first grade on Factor III, sociability. Scores at the nursery school level on Factor IV, expressiveness, are moderately but negatively related to first grade scores on independence, Factor I, and also to scores on Factor II, socialization. Nursery school scores on Factor IV are also slightly related to third grade scores on Factor III, sociability.

The loadings for the first grade sample thus result in a rather complex pattern of relationships between nursery school and first grade factor scores, at least considerably more complex than the relationships between scores based on the loadings obtained at the nursery school level.

Table 87

Behavior Ratings

Coefficients of Subject Invariance: Nursery School Loadings*

Nursery School and Third Grade Samples

		Third grade				
	Factor	I	II	III	IV	V
Nursery school	I	.074	-.180	-.181	-.457	.181
	II	.307	.538	.162	.321	-.005
	III	.144	-.099	-.041	.229	.056
	IV	-.110	-.014	.017	.149	.050
	V	.117	.038	-.088	.069	.065

*Varimax Rotation

Nursery school to third grade. The coefficients in Table 87 are the relationships among first and third grade scores derived using the nursery school loadings. The only factor on which relatively high consistency of individual differences is maintained from nursery school to third grade is Factor II, socialization. However, there are several other relationships in the table which should be considered. Relative standing in nursery school on Factor I, sociability, is inversely related to third grade relative standing on Factor IV, independence and self-direction. Scores on Factor II, labeled socialization, are positively related to third grade scores on Factor IV, independence and also to scores at the later age on sociability, Factor I. The other relationships for this five year time period are negligible.

When the loadings for the third grade data were used to derive scores for this sample of 61 subjects, present both in the nursery school and in the third grade, the coefficients presented in Table 88 were obtained. Three of the five factors -- Factors II, III, and V -- show moderate consistency over this five year period. Factor II is a combined sociability-socialization dimension; Factor III is expressiveness; and Factor V, self-assertiveness. The other two dimensions, independence and maturity, show no consistence for this time period. Predictive relationships for

Table 88

Behavior Ratings

Coefficients of Subject Invariance: Third Grade Loadings*

Nursery School and Third Grade Samples

		Third grade				
	Factor	I	II	III	IV	V
Nursery school	I	-.114	.061	.192	-.084	.149
	II	.073	.444	-.120	.063	.246
	III	-.408	-.023	.443	-.167	-.154
	IV	-.094	-.049	.429	.098	-.060
	V	-.072	.090	.176	-.370	.322

*Varimax Rotation

other factors are perhaps suggested for two of the dimensions: Nursery school scores on Factor III, expressiveness, are negatively related to third grade scores on Factor I, independence. Nursery school scores on maturity, Factor IV, are related to those on third grade Factor III, expressiveness. Scores in nursery school on self-assertion, Factor V, and those on maturity in the third grade, Factor IV, show a slight but negative relationship.

For these 61 subjects it thus appears that somewhat higher consistency and predictiveness across factors is revealed when the third grade factor structure is used in computing factor scores than when the nursery school factors are employed. In contrast, in the nursery school to first grade comparison of the preceding section, it was scores based on the nursery school loadings which seemed to yield the greatest consistency.

Nursery school to fifth grade comparisons. Using the nursery school loadings from the analysis of data on the 32 children for whom records were available both at nursery school and at fifth grade to derive factor scores, coefficients of subject invariance for the seven year span were computed and are presented in Table 89. Scores on Factor II, the socialization factor, show high consistency for this time interval, while scores on the other three factors show little or no consistency. Fifth grade scores

Table 89

Behavior Ratings

Coefficients of Subject Invariance: Nursery School Loadings*

Nursery School and Fifth Grade Samples

Nursery school		Fifth grade			
	Factor	I	II	III	IV
	I	.158	.215	-.105	-.490
	II	-.174	.710	-.125	-.428
	III	-.123	-.159	-.026	.116
	IV	.068	-.044	.216	.135

*Varimax Rotation

Table 90

Behavior Ratings

Coefficients of Subject Invariance: Fifth Grade Loadings*

Nursery School and Fifth Grade Samples

		Fifth grade			
	Factor	I	II	III	IV
Nursery school	I	.621	.107	.091	-.132
	II	-.416	-.096	.170	.114
	III	.096	-.194	.444	.239
	IV	-.468	-.102	.056	.220

*Based on loadings for the 32 fifth graders who were also rated in nursery school.

on Factor IV, an un-named factor with features which typically characterized both the socialization and independence dimensions, are moderately predicted both by nursery school scores on Factor I and Factor II, the sociability and socialization factors, respectively; however, both relationships are negative.

When the loadings for the fifth grade data were used to derive scores, those for two factors were found to have moderate-to-high consistency (Table 90): Scores on socialization, Factor I, were highly related over this seven year interval, while those for Factor III, sociability, show moderate stability. Scores on the other two factors showed slight consistency. High scores in the nursery school on Factor II, called independence, and on Factor IV, expressiveness, were associated with low fifth grade scores on socialization, Factor I. Other relationships over this time period were low to non-existent.

Subject invariance for the between grade comparisons.

Consistency from first to third grade. The subject invariance for the first to the third grade comparisons based on the first grade loadings is given in Table 91. Scores on three of the factors -- Factors I, independence, II, socialization, and IV, emotional expressiveness -- were found to yield moderate degrees of stability in

Table 91

Behavior Ratings

Coefficients of Subject Invariance - First Grade Loadings*

First and Third Grade Samples

		Third grade				
	Factor	I	II	III	IV	V
First grade	I	.559	.105	.103	-.010	.118
	II	.182	.528	.227	-.180	.048
	III	-.082	-.060	.278	.246	-.010
	IV	.007	-.126	-.106	.526	.216
	V	.192	.156	.160	.070	.212

*Varimax Rotation

Table 92

Behavior Ratings

Coefficients of Subject Invariance - Third Grade Loadings*

First and Third Grade Samples

		Third grade				
	Factor	I	II	III	IV	V
First grade	I	.527	-.058	-.218	.140	.141
	II	-.103	.458	-.080	.038	.064
	III	-.030	-.116	.580	-.088	.013
	IV	-.009	-.149	.277	.288	-.030
	V	.118	.050	.206	-.003	.275

*Varimax Rotation

relative standing for this two year period. Scores on Factor III, sociability, showed a slight degree of consistency for this time interval, as did scores on Factor V, the assertiveness-competitiveness dimension. In each case the highest relationship between scores on the factors from the first grade to the third grade involves the same factor at both ages.

When the loadings from the third grade analyses were used to derive scores, the coefficients obtained are those presented in Table 92. Scores on Factors I, independence, II, socialization, and III, expressiveness, are moderately-to-highly consistent over this time period, while scores on Factors IV, the sociability factor, and V, assertiveness-competitiveness, were only slightly consistent for this age span. Again, the highest relationships between scores for the different grade levels were obtained for scores on corresponding factors, with first grade scores on any given factor little if at all related to scores on other factors at the third grade level.

First to fifth grade comparisons. Table 93 presents the coefficients of subject invariance for those subjects on whom ratings were available in both the first and fifth grades. The coefficients were obtained from scores based on the factor loadings for the earlier age level. Relative

Table 93

Behavior Ratings

Coefficients of Subject Invariance: First Grade Loadings*

First and Fifth Grade Samples

		Fifth grade					
	Factor	I	II	III	IV	V	VI
First grade	I	.638	-.097	.208	-.300	.435	.123
	II	.093	-.062	.112	.072	.058	-.337
	III	-.065	-.223	.450	-.294	-.130	.048
	IV	-.170	.394	.005	.176	-.163	.136
	V	-.193	.400	.172	.217	.024	.090
	VI	.253	.174	-.057	-.189	.489	.279

*Varimax Rotation

standing on Factor I, socialization, shows high consistency over this four year period; in addition, it is positively related to fifth grade standing on resistance and negatively related to scores on independence. Scores on Factor III, expressiveness, show moderate consistency for this age span. Except for a slight tendency for these scores to be negatively related to fifth grade sociability, Factor II, and independence, Factor IV, no other relationships are evident.

Scores on the other four factors show slight or no consistency for this four year period. Factor II, sociability, while showing no consistency, has a slight to moderate negative relationship with fifth grade scores on Factor VI, creativity. First grade scores on Factor V, resistance, also show no consistency but they are positively correlated with fifth grade scores on sociability, Factor II. Scores on Factors IV and VI show little more consistency; over this four year period they too are more highly related to scores on other factors than they are to themselves. First grade scores on independence, Factor IV, are slightly to moderately related to fifth grade scores on sociability, Factor II, and first grade scores on creativity, Factor VI, are positively related to fifth grade scores on resistance, Factor V.

Similar results are obtained when the scores are derived using the fifth grade factor structure (cf. Table 94):

Table 94

Behavior Ratings

Coefficients of Subject Invariance: Fifth Grade Loadings*

First and Fifth Grade Samples

		Fifth grade			
	Factor	I	II	III	IV
First grade	I	.569	-.205	.065	.001
	II	-.044	.170	-.293	-.168
	III	.013	.110	.159	-.054
	IV	-.317	.164	.035	.479

*Varimax Rotation

Table 95

Behavior Ratings

Coefficients of Subject Invariance - Third Grade Loadings*

Third and Fifth Grade Samples

		Fifth grade					
	Factor	I	II	III	IV	V	VI
Third grade	I	.608	-.145	-.079	.026	-.203	.127
	II	-.006	.617	.282	.170	.030	-.143
	III	-.156	.082	.709	.518	.068	.290
	IV	.060	-.402	.070	.204	-.221	.050
	V	-.143	-.250	.061	-.339	.116	.180
	VI	.325	.124	.026	-.146	.337	.207

*Varimax Rotation

Scores on the socialization dimension, Factor I, are quite consistent from the first to the fifth grade. Scores on Factor IV, expressiveness-openness, are moderately consistent for this four year period; in addition, the first grade scores on this factor are negatively related to the fifth grade scores on socialization, Factor I. No consistency marks the second and third factors, independence and sociability. The other relationships between scores on different factors at the two ages are small or nonexistent except, perhaps, for a slight negative relationship between first grade independence and fifth grade sociability, Factor III.

Third to fifth grade comparisons. The coefficients in Table 95 are based on third and fifth grade scores, derived by using the third grade factor loadings. The coefficients for the first three factors -- expressiveness, socialization, and industriousness -- show high consistency for this two year period. The scores on the last three factors -- self-reliance and poise, social participation, and assertiveness -- show slight-to-negligible consistency.

Third grade scores on socialization, Factor II, are slightly related to fifth grade scores on Factor III, industriousness. Third grade scores on Factor III, industriousness are substantially related to fifth grade scores on Factor IV, self-reliance and poise, and slightly to scores

Table 96

Behavior Ratings

Coefficients of Subject Invariance - Fifth Grade Loadings*

Third and Fifth Grade Samples

		Fifth grade			
	Factor	I	II	III	IV
Third grade	I	.578	.208	.003	-.180
	II	-.277	.595	-.045	.132
	III	-.011	-.007	.438	-.138
	IV	-.312	.055	-.139	.515

*Varimax Rotation

on assertiveness, Factor VI. Scores at the third grade on self-reliance and poise, Factor IV, are moderately and negatively related to scores on fifth grade Factor II, socialization. Third grade scores on Factor V, social participation, are negatively related to scores two years later on Factor IV, self-reliance and poise. Third grade scores on Factor VI, assertiveness, are moderately related to fifth grade scores on Factors I, expressiveness, and V, social participation.

For the next analysis the fifth grade factor loadings were used as the basis for deriving scores for the third and fifth grade samples. The relationships between these two sets of scores are given in Table 96. These coefficients indicate that scores on each of four factors--socialization, independence, sociability, and expressiveness-- are moderately-to-highly consistent for the two year interval between pairs of ratings.

In general, the relationships at the two ages as given in the off-diagonal elements of Table 96 are much lower than in the preceding analysis where factor scores were derived using the third grade loadings. However, two of the relationships should be noted: Third grade scores on Factor II, independence, and on Factor IV, expressiveness, show a slight but negative relationship to fifth grade scores on Factor I, socialization. The other off-diagonal elements in the table are negligible.

Subject invariance on the behavior patterns. The subject invariance coefficients indicate that the most stable dimension of individual differences from nursery through elementary school is socialization. This factor with loadings on such variables as respectful of others' rights, not negativistic, sympathetic, kind, and does not tease, was also one of the most persistent in terms of invariance of factor structure.

A second factor, relatively invariant from nursery school through grade school, is expressiveness, which showed moderate to high coefficients of subject invariance in a number of the analyses, though not in all as was the case with socialization.

A third factor on which scores computed at different ages showed some consistency is sociability, a common factor throughout the age groups studied; however, high or even moderate coefficients of subject invariance did not always emerge for this factor.

Scores on the fourth major factor over all of the age groups studied--independence--were sometimes found to be correlated over the comparison periods, and sometimes not.

Correlation coefficients for intelligence test scores for the same age comparisons constitute a frame of reference for evaluating the magnitude of the coefficients of subject

Table 97

Achievement Ratings

Coefficients of Subject Invariance - Third Grade Loadings*

First and Third Grade Subjects

		Third grade	
	Factor	I	II
First grade	I	.532	.145
	II	.138	.599

*Varimax Rotation

invariance. The coefficients for the dimension of socialization are comparable to the correlation coefficients for intelligence test scores reported by Honzik, Macfarlane, and Allen (1938), and subject invariance coefficients for some of the other factors presented above approach this level.

The consistency of achievement patterns in elementary school.

First and third grade comparisons. A subject invariance coefficient of .607 was found between the first and third grade scores when they were derived using the loadings for the general achievement factor obtained at the first grade level. This coefficient indicates considerable predictiveness over this two year period for general achievement as defined by the first grade factor. The consistency of achievement from the first to third grade, based on the third grade factor structure, is given by the coefficients presented in Table 97. The coefficient of subject invariance for Factor I, motor skills, is .532, and for Factor II, language skills, .599; thus, scores on the more differentiated factor structure shows substantial consistency over this time period. As might be expected, the off-diagonal values indicate that relative standing in the first grade on Factor I is essentially unrelated to relative standing on the second factor two years later; similarly, scores at

Table 98

Achievement Ratings

Coefficients of Subject Invariance - Fifth Grade Loadings*

First and Fifth Grade Samples

		Fifth grade	
	Factor	I	II
First grade	I	-.041	-.062
	II	-.328	.096

*Varimax Rotation

Table 99

Achievement Ratings

Coefficients of Subject Invariance - Third Grade Loadings*

Third and Fifth Grade Samples

		Fifth grade		
	Factor	I	II	III
First grade	I	.339	-.197	.008
	II	-.194	.747	.374
	III	-.168	.200	.523

*Varimax Rotation

the first grade level on Factor II do not predict third grade scores on Factor I.

First grade to fifth grade comparisons. The coefficient of subject invariance for the first to the fifth grade ratings, using the first grade factor structure, is .212. When scores at the two levels are based on the fifth grade factor structure, neither first grade relative standing on verbal skills nor on motor skills predict relative standing on these variables in the fifth grade. In fact, the only correlation worthy of note is one off-diagonal element, a negative relationship of .328 between motor skills at grade one and verbal skills in the fifth grade.

Third to fifth grade comparisons. Table 99 contains the coefficients of invariance for the subjects present at both the third and the fifth grade levels, the two sets of scores being based on the third grade factor structure. The coefficients in the diagonal indicate the extent to which third grade scores on motor skills (Factor I), "drills skills" (Factor II), and effective verbal expressions (Factor III), predict fifth grade scores on these same dimensions. The only off-diagonal value of any size is .374, indicating that third grade individual differences in "drills skills," Factor II, are positively related to fifth grade scores on Factor III, effective verbal expression.

Table 100

Achievement Ratings

Coefficients of Subject Invariance - Fifth Grade Loadings*

Third and Fifth Grade Samples

		Fifth grade	
	Factor	I	II
Third grade	I	.657	.027
	II	-.029	.291

*Varimax Rotation

When the two sets of scores are derived using the fifth grade loadings, the consistency of relative standing during the two year period is shown by the values in Table 100. Factor I, motor skills, yields a coefficient of .657 and Factor II, verbal skills, yields a coefficient of .291. Both of the off-diagonals are approximately zero.

Subject invariance on the achievement patterns. There is, then, fair-to-substantial consistency in relative standing on the dimensions of achievement from the first to the third grade, and from the third to the fifth grade on the factors obtained, regardless of which of the appropriate factor structures was used in deriving the factor scores. The first and fifth grade comparisons, however, show little or no predictiveness over this four year period of time, with the possible exception of the negative relationship between scores for motor skills at the first grade and those for verbal skills in the fifth grade, both obtained using the fifth grade factor structure.

Behavior Achievement Interrelationships

Relationships among scores on the behavior and achievement factors at each of the elementary grades provide not only an indication as to the dimensions which tend to vary together at each level, but provide an opportunity to ascertain how persistent these

Table 101

First Grade Behavior and Achievement Relationships

		Achievement	
	Factor	I'	II'
Behavior	I	.447	.614
	II	.057	.185
	III	.140	.233
	IV	-.197	.136
	Sum of squared correlations	.261	.484

relationships are during the elementary grades. The relationships between factor scores for two different levels indicate the predictive value of scores on the factor at one age for scores on the factors at the later age. The behavior factors considered will only be those obtained from data on the twenty variables used both in nursery school and in the elementary grades.

In each of the tables considered, the correlations in the columns have been squared and summed. Since scores on the row factors are uncorrelated, the square root of this value yields the multiple correlation of the low factors and the column factor (uncorrected for shrinkage).

To facilitate discussion of the relationships among the behavior and achievement factors, the Roman numerals which refer to the achievement factors have been primed.

Relationships for the first, third, and fifth grades. Table 101 provides the relationships between behavior and achievement for the 78 first grade subjects. Relative standing on independence, Factor I, is moderately correlated with motor skills, Factor I', and substantially correlated with verbal skills, Factor II'. A relationship between sociability, Factor III, and verbal skills, Factor II', seems also to be suggested. The other relationships are negligible. One cannot say from these relationships

Table 102

Third Grade Behavior and Achievement Relationships

		Achievement	
	Factor	I'	II'
Behavior	I	.263	.649
	II	.160	-.060
	III	-.316	.172
	IV	.392	.266
	V	.186	.070
	Sum of squared correlations	.383	.591

Table 103

Fifth Grade Behavior and Achievement Relationships

		Achievement		
	Factor	I'	II'	III'
Behavior	I	.048	.281	.007
	II	.579	.126	-.152
	III	.032	.288	.125
	IV	.136	-.046	-.346
	Sum of squared correlations	.357	.180	.158

that a behavior dimension facilitates an achievement dimension, or vice versa; indeed, it may be that the relationship is a function of a "halo effect" since at a given grade level the same teachers who rated the children on the behavior variables also rated them on achievement scales.

The behavior achievement relationships for the third grade sample of 61 children are given in Table 102. Scores on independence, Factor I, are slightly to moderately related to those on motor skills, Factor I', and very substantially related to those on verbal skills, Factor II'. Expressiveness, Factor III, is negatively related to motor skills achievement, Factor I'. A dimension which did not occur in the other elementary school analyses, maturity, Factor IV, is moderately related to both of the achievement factors. The sum of the squared correlations indicate that for both achievement factors, there would be a gain in predictive efficiency for the appropriate combination of scores on the behavior factors.

Table 103 provides the interrelations among the behavior and achievement factors for the fifth graders. Independence, Factor II, is substantially related to language skills, Factor I'. The correlations of scores on Factors I and III, socialization and sociability with motor skills, Factor II' are suggestive, but it must be

Table 104

Nursery School Behavior Related to First Grade Achievement

	Factor	First grade	
		I'	II'
Nursery school	I	-.078	-.134
	II	-.100	-.162
	III	-.021	.174
	IV	.153	-.013
	Sum of squared correlations	.040	.075

recognized that these values are based on only 32 subjects. Expressiveness, Factor IV, is negatively related to penmanship, Factor III'.

For each of the three grades one behavior dimension, independence, is consistently related to scores on the achievement factors. The relationships between scores on independence and those on verbal skills appears to remain consistently high throughout the elementary grades. On the other hand, the relationship of scores on independence with those on the motor skills factor decline from a high correlation in the first grade to a negligible value in the fifth grade. The expressiveness and motor skills relationships are consistently negative: Initially the value is low, in the third grade moderate and moderate also in the fifth grade if one considers that penmanship is basically a motor skills factor which has split off from the motor skills factor at the earlier levels. None of the other behavior factors appear to be consistently related to the motor skills dimension.

Nursery School Behavior Related to Elementary School Achievement. Table 104 gives the relationships between scores on behavior factors at the nursery school level and scores on achievement factors in the first grade for those 78 subjects on whom records were available on both occasions. Neither

Table 105

Nursery School Behavior Related to Third Grade Achievement

		Third grade	
	Factor	I'	II'
Nursery school	I	-.147	-.207
	II	.307	.132
	III	.073	.299
	IV	.175	-.002
	V	.036	.026
	Sum of squared correlations	.152	.150

Table 106

Nursery School Behavior Related to Fifth Grade Achievement

		Fifth grade		
	Factor	I'	II'	III'
Nursery school	I	-.226	.260	.154
	II	-.062	-.300	-.229
	III	-.145	.210	-.175
	IV	.276	.170	.144
	Sum of squared correlations	.152	.230	.128

individually, nor collectively as shown by the sum of squared correlations, are any of the relationships noteworthy. Achievement in the first grade does not appear to be predictable from nursery school ratings on the 20 behavior scales which were used at that level as well as in the elementary grades.

The correlations between nursery school scores on behavior factors and the third grade achievement dimensions for 61 subjects are given in Table 105. Nursery school scores on socialization, Factor II, are moderately related to third grade scores on motor facility, Factor I'. Openness and expressiveness in nursery school behavior, Factor III, is related to third grade verbal performance, Factor II'. The other relationships appear to be negligible.

Table 106, based on the 32 subjects available both in nursery school and fifth grade, shows the correlations between scores on behavior factors at the earlier level and those on the fifth grade achievement factors. Considering the size of the sample, the magnitude of the correlations, and the lack of similar relationships in the earlier grades, it would appear hazardous to draw conclusions from the values in this table.

Table 107

Relationships Among Factors of First Grade Behavior and Third Grade Achievement

		Third grade	
	Factor	I'	II'
First grade	I	.236	.404
	II	.128	.004
	III	-.030	-.038
	IV	-.071	.279
	V	.146	.143
	Sum of squared correlations	.100	.262

Table 108

Relationships Among Factors of First Grade Achievement and Third Grade Behavior

		Third grade				
	Factor	I	II	III	IV	V
First grade	I	.481	.098	-.155	.424	.094

Table 109

Relationships Among Factors of First Grade Behavior and Fifth Grade Achievement

		Fifth grade	
	Factor	I'	II'
First grade	I	-.022	-.215
	II	-.140	-.241
	III	-.142	.079
	IV	.306	.252
	V	.186	.108
	VI	.126	-.049
	Sum of squared correlations	.185	.188

Table 110

Relationships Among Factors of First Grade Achievement and Fifth Grade Behavior

		Fifth grade			
	Factor	I	II	III	IV
First grade	I	-.121	.201	.237	-.268

Interrelationships Early and Late Behavior Achievement Factor Scores. Table 107 presents the relationships between first grade scores on behavior factors and third grade scores on achievement factors for 56 children. Scores in the first grade on independence, Factor I, appear to be related to third grade performance on motor skills, Factor I', and they are moderately related to third grade scores on verbal skills, Factor II'. First grade expressiveness, Factor IV, also appears to be related to verbal skills, Factor II'. The other relationships are not remarkable.

Table 108 gives the relationships between first grade scores on Factor I and third grade behavior factors. Relative standing on this first grade general factor is related to relative standing on both third grade Factor I, independence and third grade Factor IV, sociability, (cf. Table A-14 and A-16).

The relation of first grade scores on behavior factors to scores on fifth grade achievement factors for 28 subjects is shown in Table 109. Again a relationship is suggested between independence, Factor IV, and the verbal and motor skills dimensions, Factor I' and II', respectively. The relationship of Factors I and II, socialization and sociability, to Factor II', motor skills, is negative and of comparable value to the correlations just considered;

Table 111

Relationships Among Factors of Third Grade Behavior and Fifth Grade Achievement

		Fifth grade	
	Factor	I'	II'
Third grade	I	.076	.074
	II	.101	.240
	III	.536	.130
	IV	.292	-.445
	V	-.204	.312
	VI	.179	.038
	Sum of squared correlations	.462	.377

however, the small sample size and the lack of consistency of this finding across the different samples raise a question as to whether they should be given equal consideration.

Table 110 gives the relationships between scores on the first grade general factor and scores on the four fifth grade behavioral dimensions. The positive relationship with fifth grade achievement and later independence, though small, is consistent with that reported in Table 108 and may suggest a trend. A negative relationship with Factor IV, expressiveness and openness, is present. A small negative relationship was also present with this dimension, Factor III, in the earlier comparison Table 108.

Table 111 gives the correlations between third grade scores on behavior factors and fifth grade scores on achievement factors for 28 subjects. Attention should be directed to two of these relationships: Third grade scores on industriousness, Factor III, are moderately related to fifth grade scores on verbal skills, Factor I', and third grade scores on poise and self-reliance, Factor IV, show some relation to Factor I', the verbal skills factor, as well as a moderately negative correlation with motor skills, Factor II'. The high relation of Factor III, industriousness, and Factor IV, poise and self-reliance, to the behavior factor of independence at other ages was discussed earlier. It thus appears, at

Table 112

Relationships Among Factors of Third Grade Achievement and Fifth Grade Behavior

		Fifth grade			
	Factor	I	II	III	IV
Third grade	I	.049	-.126	-.101	-.141
	II	-.616	-.057	.160	-.102
	III	.065	.302	-.068	-.104
Sum of squared correlations		.386	.110	.040	.041

least with respect to verbal skills, that earlier scores on the dimension of independence have predictive value for later performance in the verbal skills area.

The relationships between scores on the achievement factors in the third grade and those on the fifth grade behavior factors are given in Table 112. Scores on the third grade drill skill, Factor II, appear to be decidedly negatively related to relative standing on socialization in the fifth grade, (Factor I, Table A-26). The positive relationship between facility in verbal expression at the earlier level, Factor III, and the second fifth grade behavioral factor, independence (Table A-27) while based on a small number of subjects, appears to be consistent with the converse relationship, i.e., that early independence predicts later performance in verbal skills.

In summary, the dimension of independence as rated in the elementary grades appears not only to be related to concurrent performance on verbal skills but it also appears to have some predictive value for verbal skills achievement at later ages. At the same time it should be pointed out that to date the results do not indicate that scores on this dimension have predictive value in addition to that which would be provided by earlier scores on the achievement factors themselves.

In relating early achievement to later behavior the most consistent finding was a positive relation between early achievement and independence at the later levels.

Chapter VIII

Summary: Cross-Sectional and Longitudinal Studies

The present study was an empirical examination of the general dimensions of a broad sample of nursery school behavior, and a followup of elementary school behavior and achievement. The specific purposes of the study were as follows:

1. To determine the patterns of behavior for a group of normal children in nursery school as these behaviors are described in specific molar terms.

2. To assess the extent to which two different samples of children from the same population display similar patterns of behavior.

3. To determine the patterns of behavior for boys and girls separately, and to ascertain their similarity.

4. To determine the patterns of behavior for a group of children at age three years and again for the same group at age four and one-half, to compare the patterns at the two age levels, and to measure their consistency for this age span.

5. To determine patterns of behavior at elementary grades one, three, and five, for sub-samples of the original subjects; to measure behavioral consistency during these years, and to assess the similarity of the patterns at the different age levels.

6. To compare results from separate analyses of elementary school behavior with the behavior patterns at nursery school age, and to compare results obtained at different ages within the elementary school. Additionally, to relate these patterns to achievement data for grades one, three, and five.

The data for the study were systematically gathered at the Institute of Human Development Nursery School, University of California, Berkeley, from 1930 to 1938. Teachers at the Institute rated the children used in the study each semester of their attendance at the nursery school on 61 behavior variables selected from a large inventory of nursery school behavior. In the elementary school followup, the elementary school teachers rated the children on the 20 behaviors selected for that portion of the study and the achievement measures.

The data were analyzed for the purposes described above utilizing principal components factor analyses with varimax rotations. The techniques described by Pinneau and Newhouse (1964) were used in comparing factors across analyses and in making comparisons of relative stability with age.

To determine the patterns of behavior for the nursery school group as a whole the data analyzed were those collected on the children when they were of an average age of three years and six months (Basic Sample: N=138). These analyses yielded ten factor patterns. In order of importance (i.e., amount of variance accounted for) these factors were tentatively labeled emotional reactivity, sociability, socialization, verbal creativity, confidence, achievement, affability, self-assertion, affection, and vanity. Three of these--emotional reactivity, sociability, and socialization--accounted for 44 per cent of the total variance: the remaining seven accounted for 35 per cent of the total variance.

To assess the invariance of these dimensions, the Basic Sample was divided into the children who attended the Institute between 1930 and 1934 (the Early Invariance sample), and those who attended the Institute between 1934 and 1938 (the Late Invariance sample). The data from these two samples were analyzed independently, utilizing the same methods that were used with the data of the Basic Sample. Interest in this case was in comparing the general dimensions of behavior isolated for two different groups of children.

The results showed considerable correspondence between the factors for the two groups. Several factors were common to both analyses: sociability, emotional reactivity, socialization, verbal creativity, and achievement. Two others, labeled confidence and affability in the Early Invariance sample, appeared to be fused into a single factor in the Late Invariance sample. The objective measures of factorial invariance indicated substantial relationships between factors for the two independent analyses. Because of their similarity with one another and with the factors obtained for the Basic Sample, the factors obtained in the invariance analyses considerably support the factors isolated in the Basic Sample.

Separate analyses of the data for the two sexes showed that ten factors identified from separate analyses of data from the girls. These factors were sociability, emotional reactivity, socialization, verbal activity (creativity), confidence, affection, achievement, assurance (self-assertion), affability, and vanity. Similar results were obtained for the boys' sample. Several small factors that were difficult to interpret but which met the criterion of an eigenvalue of 1.00 appeared in either the analyses for the boys or for the girls.

The importance of the factors differed somewhat from the boys to the girls samples. Factor patterns of sociability, socialization, verbal creativity, and affection accounted for more variance for the boys than for the girls. Emotional reactivity, confidence, affability, and assurance factor patterns were more important in the analyses of the girls' data than for the boys' analyses.

The first of the longitudinal studies reported examined the similarity of factor structure obtained for a sub-sample of 69 children upon whom data were available at the time they were an average of three years of age and also when they were an average of four and one-half years of age. The data from the two different time periods were independently analyzed and the obtained factors were compared. The analyses showed that three factors obtained at the two age levels were highly related for the two ages and relatively independent of the other factors. These were sociability, confidence, and socialization. Two factors at age three--emotional reactivity and

and one-half years. Four other factors that appeared in both analyses and seemed similar in some degree were also different in notable respects, as shown by the marker variables and the coefficients of factor invariance. These factors included affection, affability, and achievement. Some factors of lesser importance appeared at both ages and seemed little related to any factors in the other set. A number of the more prominent factors changed in relative importance from the three to the four and one-half year sample.

A second purpose of the analysis of the Consistency Samples was to determine the degree of stability in relative standing of the subjects over time. The coefficients of subject invariance obtained ranged from .305 to .735, with a median of .524. These coefficients are comparable in magnitude to correlation coefficients obtained in longitudinal studies of intelligence over the same time period and ages.

The twenty behavior variables rated at the elementary school years were analyzed separately for grades one (N=78), three (N=61), and five (N=32), using methods identical to those used in the foregoing analyses. Four behavioral factors, designated independence, socialization, sociability, and expressiveness, emerged from the first grade analyses. These four accounted for 68 per cent of the total variance in the behaviors studies. Two of these factors--independence and expressiveness--did not appear in this form in the analyses of 61 variables at the nursery school level.

The analyses of the third grade data yielded five factors accounting for 75 per cent of the total variance of behavior ratings. These factors were labeled independence, socialization-sociability, emotional reactivity, maturity, self-assertion.

Four factors were obtained from the analyses of the fifth grade behavior ratings. In order of importance they were socialization, independence, sociability, and emotional reactivity. The first two of these accounted for 28 and 22 per cent of the total variance, while the latter two accounted for 13 and 12 per cent.

Six elementary school achievement variables were analyzed for grades one, three, and five, using methods previously applied to the behavior ratings. Two achievement factors were obtained at each of the grade levels. For the first and third grades these could be identified as motor skills and language skills. For the fifth grade sample the two factors were similarly labeled, although the language skills factor was more complex than at the earlier ages, with negative loadings for some of the motor skills variables. The per cent of total variance accounted for by the two factors at each level ranged from 71 to 81 per cent.

To compare the factors obtained at the nursery school and grades one, three, and five while controlling for the variables rated, the data for the 138 children in the Basic Sample were re-analyzed using only those ratings obtained in the nursery school on the 20 variables used in the elementary school followup. This analysis yielded four factors, all of which were found in earlier analyses utilizing data on the 61 variables. These factors were sociability, socialization, verbal creativity, and independence.

To compare factors at the nursery school level with those obtained in the elementary grades the data from the nursery school for the elementary school samples was analyzed thus eliminating any differences in the factors due to different subjects. Socialization and sociability showed the most stable relationships between nursery school and elementary school factor structures. The factors labeled independence and expressiveness varied in their degree of stability across the ages studied.

In the first grade to third grade factor comparisons, and in the comparable first to fifth grade comparisons, first grade factors were highly related to one or more third or fifth grade factors, and usually to the factor of the same name. In addition, other slight to moderate relationships were found. For the most part comparable results were also found in the third grade-fifth grade comparison.

In the analyses to assess subject invariance from the nursery school to elementary school, the consistency of individual differences as opposed to factor structure over time, consistent subject invariance was found for the socialization dimension. Expressiveness was the factor second in consistency of individual differences over the time periods studied. In some cases relative standing on one factor at an earlier age was somewhat predictive of relative standing on a different dimension at a later age (e.g., nursery school sociability factor scores were negatively related to third grade expressiveness scores).

Interrelationships among the behavior and achievement factors were obtained at each level and between the various age levels. Scores on the dimensions of independence and verbal skills were consistently the most highly related for comparisons at each grade level as well as for between grade comparisons.

Over-all in the various analyses done at different ages a number of factors of similar structure were obtained, indicating the general importance of these dimensions at different ages encompassed by the study. In general, the analyses indicated considerable comparability of the dimensions isolated at different ages and consistent relative standing of the subjects over the time periods studied on some of these dimensions.

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Appendix

Table A-1

Nursery School Ratings for First Grade Subjects

	Variable	Factor I
13.	Social, not solitary	.852
16.	Active	.850
3.	Enthusiastic	.815
19.	Rarely a spectator	.798
15.	Leads others	.786
5.	Initiates play	.779
4.	Competitive	.740
9.	Self-reliant	.546
12.	Friendly	.521
18.	Original	.412

Sum of squared loadings for all variables, 5,919

Minimum value which marker variables load on factor, .400.

Table A-2

Nursery School Ratings for First Grade Subjects

	Variable	Factor II
7.	Negativistic	.839
10.	Kind	-.812
11.	Respectful of others' rights	-.772
1.	Lacks inhibition	.751
6.	Teases	.636
8.	Bids for attention	.582
2.	Agreeable, good natured	-.447
20.	Free from nervous habits	-.444

Sum of squared loadings for all variables, 4.124

Minimum value which marker variables load
on factor, .400.

Table A-3

Nursery School Ratings for First Grade Subjects

	Variable	Factor III
12.	Friendly	.739
14.	Rarely embarrassed	.718
8.	Bids for attention	.644
18.	Original	.530
6.	Teases	.481
2.	Agreeable, good natured	.465

Sum of squared loadings for all variables, 2.834
Minimum value which marker variables load
on factor, .400.

Table A-4

Nursery School Ratings for First Grade Subjects

Variable	Factor IV
17. Concentrates	.804
20. Free from nervous habits	.636
18. Original	.393
15. Leads others	.373
19. Rarely a spectator	.335
9. Self-reliant	.330
5. Initiates play	.305
Sum of squared loadings for all variables,	1.897

Minimum value which marker variables load on factor, .300.

Table A-5

Nursery School Ratings for Third Grade Subjects

Variable	Factor I
16. Active	.878
3. Enthusiastic	.864
13. Social, not solitary	.840
15. Leads others	.812
19. Rarely a spectator	.783
5. Initiates play	.732
12. Friendly	.641
2. Agreeable, good-natured	.630
18. Original	.591
9. Self-reliant	.539
Sum of squared loadings for all variables,	6.170

Minimum value which marker variables load on factor, .500.

Table A-6

Nursery School Ratings for Third Grade Subjects

Variable		Factor II
11.	Respectful of others' rights	.824
8.	Bids for attention	-.778
6.	Teases	-.776
7.	Negativistic	-.772
10.	Kind	.728
1.	Lacks inhibition	-.598

Sum of squared loadings for all variables, 4.014

Minimum value which marker variables load on factor, .500.

Table A-7

Nursery School Ratings for Third Grade Subjects

Variable	Factor III
14. Rarely embarrassed	.823
20. Free from nervous habits	.660
12. Friendly	.485
9. Self-reliant	.394
8. Bids for attention	.301

Sum of squared loadings for all variables, 1.958

Minimum value which marker variables load on factor, .300.

Table A-8

Nursery School Ratings for Third Grade Subjects

Variable	Factor IV
17. Concentrates	.816
1. Lacks inhibition	.454
5. Initiates play	.396
7. Negativistic	.387
2. Agreeable, good-natured	-.365
19. Rarely a spectator	.365
15. Leads others	.324

Sum of squared loadings for all variables, 1.812

Minimum value which marker variables load on factor, .300.

Table A-9

Nursery School Ratings for Third Grade Subjects

Variable	Factor V
4. Competitive	.762
12. Friendly	.405

Sum of squared loadings for all variables, 1.330

Minimum value which marker variables load on factor, .300.

Table A-10

Nursery School Ratings for Fifth Grade Subjects

Variable		Factor I
13.	Social, not solitary	.843
19.	Rarely a spectator	.826
3.	Enthusiastic	.790
16.	Active	.775
4.	Competitive	.768
12.	Friendly	.759
5.	Initiates play	.736
15.	Leads others	.610
9.	Self-reliant	.546
2.	Agreeable, good-natured	.535
14.	Rarely embarrassed	.479

Sum of squared loadings for all variables, 5.896

Minimum value which marker variables load on factor, .400.

Table A-11

Nursery School Ratings for Fifth Grade Subjects

Variable	Factor II
8. Bids for attention	.847
7. Negativistic	.826
6. Teases	.746
11. Respectful of others' rights	-.705
14. Rarely embarrassed	.640
2. Agreeable	-.578
1. Lacks inhibition	.511
10. Kind	-.493

Sum of squared loadings for all variables, 4.092

Minimum value which marker variables load on factor, .400.

Table A-12

Nursery School Ratings for Fifth Grade Subjects

Variable	Factor III
17. Concentrates	.882
18. Original	.754
15. Leads others	.654
1. Lacks inhibition	.550
5. Initiates play	.525
19. Rarely a spectator	.432
3. Enthusiastic	.430
Sum of squared loadings for all variables,	3.266

Minimum value which marker variables load on factor, .400.

Table A-13

Nursery School Ratings for Fifth Grade Subjects

Variable	Factor IV
20. Free from nervous habits	.763
10. Kind	.474
14. Rarely embarrassed	.405
16. Active	-.366
11. Respectful of others' rights	.297
9. Self-reliant	.288
12. Friendly	.264
Sum of squared loadings for all variables,	1.554

Minimum value which marker variables load on factor, .250.

Table A-14

Same Subjects in First and Third Grades

(N=56)

Variable	First Grade Factor I	Third Grade Factor I
9. Self-reliant	.854	.681
16. Busy	.851	.879
17. Concentrates	.804	.841
5. Initiates work or play	.748	.722
20. Rarely restless or fidgety	.583	.511
18. Shows originality	.551	.489
14. Poised, self-composed	.547	.207
Sum of squared loadings for all variables,	4.205	3.872

Minimum value which marker variables load on factor, .500.

Table A-15

Same Subjects in First and Third Grades

(N=56)

Variable	First Grade Factor II	Third Grade Factor II
11. Respectful of others' rights	.867	.778
6. Teases	-.844	-.358
10. Sympathetic, kind	.798	.822
2. Agreeable, good-natured	.759	.809
8. Bids for attention	-.749	-.447
7. Negativistic	-.522	-.453
20. Rarely restless or fidgety	.425	.280
12. Friendly	.177	.727
13. Social, not solitary	.131	.428

Sum of squared loadings for all variables, 4.013 3.511

Minimum value which marker variables load on factor, .400.

Table A-16

Same Subjects in First and Third Grades

(N=56)

	Variable	First Grade Factor III	Third Grade Factor IV
13.	Social, not solitary	.810	.572
19.	Rarely a spectator	.804	.763
12.	Friendly	.662	.331
14.	Poised, self-composed	.547	.751
15.	Leads others	.531	.569
1.	Emotions readily expressed	.407	.072
5.	Initiates work or play	.294	.441
9.	Self-reliant	.132	.477
18.	Shows originality	.058	.655
	Sum of squared loadings for all variables,	2.874	2.974

Minimum value which marker variables load on factor, .400.

Table A-17

Same Subjects in First and Third Grades

(N=56)

	Variable	First Grade Factor IV	Third Grade Factor III
1.	Emotions readily expressed	.788	.896
3.	Enthusiastic	.786	.819
8.	Bids for attention	.442	.540
18.	Shows originality	.440	.304
20.	Rarely restless or fidgety	-.414	-.576
12.	Friendly	.404	.377
7.	Negativistic	.402	.138
6.	Teases	.115	.693
	Sum of squared loadings for all variables,	2.533	3.196

Minimum value which marker variables load on factor, .400.

Table A-18

Same Subjects in First and Third Grades

(N=56)

	Variable	First Grade Factor V	Third Grade Factor V
4.	Competitive	.857	.675
15.	Leads others	.451	.603
18.	Shows originality	-.371	-.006
8.	Bids for attention	.186	.382
7.	Negativistic	.087	.541
	Sum of squared loadings for all variables,	1.307	1.546

Minimum value which marker variables load on factor, .300.

Table A-19

Same Subjects in First and Fifth Grades

(N=28)

	Variable	First Grade Factor I	Fifth Grade Factor I
6.	Teases	.898	-.863
11.	Respectful of others' rights	-.810	.905
8.	Bids for attention	.716	-.789
2.	Agreeable, good-natured	-.693	.759
20.	Rarely restless or fidgety	-.562	.803
10.	Sympathetic, kind	-.442	.780
19.	Rarely a spectator	.427	-.149
5.	Initiates work or play	.348	.133
9.	Self-reliant	.225	.407
7.	Negativistic	.218	-.824
17.	Concentrates	-.169	.419
12.	Friendly	.081	.455
14.	Poised, self-composed	.051	.460
	Sum of squared loadings for all variables,	3.581	5.877

Minimum value which marker variables load on factor, .400.

Table A-20

Same Subjects in First and Fifth Grades

(N=28)

Variable	First Grade Factor II	Fifth Grade Factor III	Fifth Grade Factor II
15. Leads others	.854	.689	.258
4. Competitive	.741	.102	.738
14. Poised, self-composed	.723	-.185	.493
13. Social, not solitary	.573	.839	-.168
5. Initiates work or play	.526	.011	.875
1. Emotions readily expressed	.380	.187	-.119
9. Self-reliant	.388	-.053	.807
19. Rarely a spectator	.379	.894	-.016
12. Friendly	.320	.595	-.048
16. Busy	.252	.268	.796
17. Concentrates	.159	.178	.713
18. Shows originality	.103	-.163	.760
3. Enthusiastic	.038	.281	-.038
Sum of squared loadings for all variables	3.258	2.709	4.319

Minimum value which marker variables load on factor, .400.

Table A-21

Same Subjects in First and Fifth Grades

(N=28)

Variable	First Grade Factor III	Fifth Grade Factor IV	Fifth Grade Factor III
12. Friendly	.819	.450	.595
10. Sympathetic, kind	.776	.016	.270
1. Emotions readily expressed	.695	.842	.187
3. Enthusiastic	.593	.809	.281
20. Rarely restless or fidgety	-.517	-.304	-.022
13. Social, not solitary	.457	.315	.839
19. Rarely a spectator	.344	.242	.894
15. Leads others	.106	-.075	.659
Sum of squared loadings for all variables	3.104	2.382	2.709

Minimum value which marker variables load on factor, .400.

Table A-22

Same Subjects in First and Fifth Grades

(N=28)

Variable	First Grade Factor IV	Fifth Grade Factor II
17. Concentrates	.932	.713
16. Busy	.878	.796
9. Self-reliant	.605	.807
3. Enthusiastic	.505	-.038
20. Rarely restless or fidgety	.448	.311
4. Competitive	.299	.738
5. Initiates work or play	.289	.875
18. Shows originality	.113	.760
14. Poised, self-composed	.109	.493
Sum of squared loadings for all variables,	2.997	4.319

Minimum value which marker variables load on factor, .400.

Table A-23

Same Subject in First and Fifth Grades

(N=28)

Variable	First Grade Factor V	Fifth Grade Factor I	Fifth Grade Factor III
7. Negativistic	.865	-.824	.007
19. Rarely a spectator	-.534	-.149	.894
8. Bids for attention	.452	-.789	-.027
13. Social, not solitary	-.319	.013	.839
2. Agreeable, good-natured	-.230	.759	.097
15. Leads others	-.176	.279	.689
10. Sympathetic, kind	-.135	.780	.270
20. Rarely restless or fidgety	-.066	.803	-.022
12. Friendly	-.066	.455	.595
6. Teases	-.052	-.863	.000
11. Respectful of others' rights	-.000	.905	.040
Sum of squared loadings for all variables	1.655	5.877	2.709

Minimum value which marker variables load on factor, .500.

Table A-24

Same Subjects in First and Fifth Grades

(N=28)

	Variable	First Grade Factor VI	Fifth Grade Factor II
18.	Shows originality	.913	.760
5.	Initiates work or play	.457	.875
14.	Poised, self-composed	.343	.493
16.	Busy	.191	.796
9.	Self-reliant	.183	.807
17.	Concentrates	-.022	.713
4.	Competitive	.007	.738
Sum of squared loadings for all variables,		1.573	4.319

Minimum value which marker variables load on factor, .400.

Table A-25

Same Subjects in Third and Fifth Grades

(N=28)

Variable	Third Grade Factor I	Fifth Grade Factor IV
1. Emotions readily expressed	.962	.855
3. Enthusiastic	.825	.826
12. Friendly	.649	.530
6. Teases	.560	-.057
13. Social, not solitary	.465	.368
4. Competitive	.436	-.047
Sum of squared loadings for all variables,	3.422	2.435

Minimum value which marker variables load on factor, .400.

Table A-26

Same Subjects in Third and Fifth Grades

(N=28)

Variable	Third Grade Factor II	Fifth Grade Factor I
2. Agreeable, good-natured	.894	.767
11. Respectful of others' rights	.821	.878
10. Sympathetic, kind	.783	.790
8. Bids for attention	-.602	-.801
12. Friendly	.556	.483
6. Teases	-.486	-.875
Sum of squared loadings for all variables,	3.387	5.780

Minimum value which marker variables load on factor, .500.

Table A-27

Same Subjects in Third and Fifth Grades

(N=28)

	Variable	Third Grade Factor III	Fifth Grade Factor II
17.	Concentrates	.891	.686
16.	Busy	.877	.774
20.	Rarely restless or fidgety	.619	.350
4.	Competitive	.531	.761
5.	Initiates work or play	.446	.893
18.	Shows originality	.204	.761
9.	Self-reliant	.144	.777
14.	Poised, self-composed	-.126	.549

	Third Grade	Fifth Grade
Sum of squared loadings for all variables,	2.777	4.326

Minimum value which marker variables load on factor, .500.

Table A-28

Same Subjects in Third and Fifth Grades

(N=28)

Variable	Third Grade Factor IV	Fifth Grade Factor II
9. Self-reliant	.830	.777
14. Poised, self-composed	.731	.549
18. Shows originality	.718	.761
5. Initiates work or play	.563	.893
16. Busy	.233	.774
4. Competitive	-.144	.761
17. Concentrates	.090	.686
Sum of squared loadings for all variables,	2.412	4.326

Minimum value which marker variables load on factor, .500.

Table A-29

Same Subjects in Third and Fifth Grades

(N=28)

Variable	Third Grade Factor V	Fifth Grade Factor III
19. Rarely a spectator	.938	.853
13. Social, not solitary	.772	.807
7. Negativistic	-.486	-.016
18. Shows originality	.374	-.100
6. Teases	.346	.053
12. Friendly	.278	.560
15. Leads others	.178	.710
Sum of squared loadings for all variables,	2.309	2.684

Minimum value which marker variables load on factor, .300.

Table A-30

Same Subjects in Third Grade as in Fifth Grade

(N=28)

Variable	Third Grade Factor VI
15. Leads others	.826
7. Negativistic	.593
8. Bids for attention	.466
4. Competitive	.364
5. Initiates work or play	.336

Sum of squared loadings for all variables, 1.786

Minimum value which marker variables load on factor, .300.